Successful Calf Rearing.

J. H. BRANTOM.

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SUCCESSFUL
CALF REARING

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Reared on Brantom's Milk Meal on a Bedfordshire Farm.

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Successful Calf Rearing

WITH

VALUABLE MEDICINAL RECIPES.

By J. H. BRANTOM.

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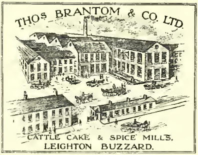
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PREFACE

THIS small Manual was the first ever published devoted entirely to the important subject of Calf-rearing, and, it has been received so favourably by Stock-breeders that we are encouraged to print another, which is the fourth edition. It has been completely revised and brought up-to-date, and with the addition of handsome photographs and new valuable recipes, we trust that it will more deserve the warm approval and kind commendation hitherto shown. Since our first edition was issued, the Board of Agriculture has given the industry marked attention, and probably we have had some small share in stimulating the interest in this profitable branch of agriculture. We in turn gratefully acknowledge the assistance of the Board's experts, and many other eminent agricultural and professional authorities—especially would we mention the help afforded us by our good friend G. Hedley Harris, Esq., whose practical knowledge of the subject has been invaluable—and we hope that our combined efforts to increase economical stock-raising in Great Britain and the Colonies will be successful.

Successful Calf Rearing.

"There can be no doubt that with the advance of scientific knowledge considerable developments are taking place in the field of practical agriculture, and farmers are becoming more impressed with the advantage of keeping abreast of the times with regard to the application to their business of up-to-date methods and the utilization of the latest scientific discoveries."—*The Rt. Hon. Earl of Carrington, K.G., President of the Board of Agriculture.*

Practice with Science.—Motto of the Royal Agricultural Society.

Trained Agriculturists Wanted.

THE need of trained men who can apply themselves to solving the countless problems which surround the agriculturist was never more felt than it is to-day. To those who have followed the history of agriculture it has become very apparent that those countries which early recognized the links between the student, the scientist, and the farmer are now leading the way in all matters pertaining to crop and animal production. The benefits have been so material that no considerations of cost have been allowed to stand in the way of scientific advancement. In America the difficulty has been to find an adequate number of men with training to carry on the special investigations which the country requires. The establishment of agricultural colleges and experimental farms has provided many scientists, yet more are wanted. The Sec-

The Uses of Science.

retary of Agriculture for the United States wrote in one of his reports that "There has never been in the history of the world such a strenuous competition between the different countries for commercial supremacy as exists to-day. Each nation is exerting itself to the utmost to provide surplus produce for exportation. In doing this, they are depending more and more upon the aid of science, and are taking advantage of every scientific discovery. In the general conflict between nations it is obvious that that country which has been the most liberal in securing properly-equipped organizers of its industry is sure to have the advantage in this commercial strife."

Science has shown the farmer how to exercise true economy in working his land, feeding his cattle, and buying his materials; and economy combined with efficiency must be the aim of present-day agriculturists in order to ensure any measure of success possible in these competitive times. This they can attain if they will only learn, and made use of the discoveries, results, and new inventions which practical scientific men are continually making known to the world.

Labour Saving Machinery.

There is no doubt that the vast majority of farmers now are getting less conservative in these matters, and day by day are making increasing and judicious use of scientific aid in every branch of Agriculture in a manner their ancestors never dreamt of. For an instance of this marvellous progress we have only to turn to Agricultural labour-saving machinery, for much of which, it is only fair to own, we are indebted to the Americans. With what feelings of surprise, and perhaps alarm, would the farmer of fifty years ago look over an up-to-date farm, and thereon see cows milked, land ploughed, potatoes dug, cream separated from milk direct from the cow, and corn reaped and actually tied into sheaves, all by machinery.

The Feeding Stuffs Act.

Then again, the researches and experiments regarding the value of Feeding Stuffs, Manures, &c., which are constantly being made by the Royal Agricultural Society's experts and other eminent men, are invaluable to the farmer. They show him in some measure the constituents and the value he can expect in these articles, and especially now he is protected by an Act of Parliament (the Feeding Stuffs and Manures Act), he should take care to get value for money. And so on through every branch of Agriculture we can trace the wonderful change the application of science has wrought, the only thing seeming unchanged being that unknown quantity, which to the farmer can bring either gain or loss, viz., the weather.

British Farming First.

Speaking generally no other country grows so much corn to the acre or breeds better cattle than the United Kingdom, but owing to our fiscal conditions there is every need for us still to strive for greater results and higher perfection.

More Meat Wanted.

The increased rearing of live stock, and a corresponding increase of meat and dairy produce are, and must remain, important factors in successful British farming. Meat certainly should be produced in much larger quantities in this country than at present, and its production should be encouraged equally with wheat-growing, when the question of England's food supply in time of war is seriously considered by the Government. Our home supply being altogether so inadequate, foreign rivals have gladly rushed in to supply the deficiency, and if the British farmer means to hold his own against this powerful competition, he must by every aid and economy keep the cost of production at the very lowest figure.

Agriculture the greatest Industry.

It must not, however, be forgotten that although we import more food stuffs than any other country, Agriculture is still our greatest industry, and will remain so if those engaged therein will only keep up-to-date and energetic, and not above taking a lesson now and again from their foreign competitors. In the old days the British farmer made money easily, and so did nearly all traders and manufacturers, but increased competition has now reduced profits on all sides. The farmer, therefore, should remember that he is not the only one who has to work harder and earn less than his predecessors, and he will do better to look to the future than dwell on the past. British agriculture is mainly devoted to the production of corn, meat, and milk and it is chiefly in regard to the latter two objects that we desire to offer a few suggestions; and when it is remembered that the annual production of milk alone in this country is estimated to be worth £50,000,000 we think everyone will agree that any hint or suggestion towards economy or increased production, has an untold accumulative value and is, therefore, worthy of serious attention.

The Golden Calf.

But to get quickly to the subject of this Booklet—of all methods of stock farming, the one by which the farmer should average most profit in the long run, is that of economically rearing good calves every season, either of his own breeding or well-bred ones bought in.

The calf in modern farming may be truly called the Golden Calf, for no other animal will bring the farmer and small-holder more golden profit. It has no foreign rival or competitor, for although horses are freely imported into this country, the Board of Agriculture stedfastly refuses to allow the importation of store cattle owing to the risk of disease; and therefore in calf

The Smallholder.

The Serious Shortage of Young Cattle.

rearing the British stockkeeper gets all the benefit of protection without its drawbacks, and with ordinary judgment and care can make money easily and surely. But notwithstanding this satisfactory state of affairs the number of young cattle in this country has been shrinking with alarming rapidity, with the result that the demand is greater than the supply, and graziers and feeders who depend on other people to raise their store stock are continually petitioning the Government to allow them to import young cattle from abroad. Therefore it is highly important that every farmer who wishes to maintain the embargo should rear all the calves that he possibly can and avail himself of the good profits therefrom. As we have said there is and has been for the past few years a serious shortage of young cattle, and the Agricultural Returns lately showed a decrease of 125,000; and not only in this country is a decrease apparent but in the United States also, where the Agricultural Department has just reported a decrease of 2,187,000 head of cattle during the last two years; although 100,000 head less were exported than in the previous year.

These figures mean higher prices for cattle and bigger profits for all calf rearers and undoubtedly the industry bids fair to be the most remunerative branch of agriculture for some years to come.

So many of our graziers and feeding farmers are afraid of the trouble of rearing and weaning calves, but with a little organizing, and with the assistance of a good milk substitute, a splendid lot of young stock can be obtained at small cost.

It has also hitherto been thought impracticable to carry on this industry on large tillage farms not adapted for the production of milk, but under our system it becomes quite easy and profitable.

Young calves grow, it may be said, night and day in a fold yard during the summer season when well supplied with vetches or other green food, which can always be obtained at a minimum of cost upon such farms, and manure is being made at the same time that will be useful.

Sometimes pure-bred or cross-bred calves are purchaseable at very little money, that will grow very rapidly, and when this is the case no consideration of shortness of milk need now stop the buyer. Even if good store bullocks can be bought at low prices through shortness of grass or other causes, it will be found that equal animals can be reared at home at much less cost, without counting the manurial gain.

But when bullocks are scarce and dear, the difference is greater, as the home cost remains the same, and is therefore very much in favour of the rearer. Another important consideration is that the cost is spread over a long period, as it is not every farmer who can find the £250 or £300 necessary to buy in, say twenty store beasts, when he wants them.

Home-bred Cows for the Dairy Farmer.

But it is even far more important and profitable for the dairy farmer to rear his own bred stock, as generally home-bred cows are more satisfactory in every respect, and especially now abortion is so prevalent there is always the risk of introducing this terrible trouble into the herd by buying in strange cows.

It is certain that the cheapest and surest way of securing good cows is by rearing one's own calves.

Their Cost.

If heifers are bought in on bringing their first calf, or thereabouts, they will cost £15, £16, or £17 apiece. If with their second or third calf, a £5 note more. This is a lot of money. On the other hand from the day the home-bred calf is born till it becomes profitable in milk-giving will be a period of two years, or say two and a half years—130 weeks. Her keep during that time will not amount to more than 1s. 9d. a week all through, and allowing £2 for her worth as a calf, we have the young cow with her first calf at a cost of £13 7s. 6d., and £1 or 30s. may be deducted from this as the value of the calf. Add to this the inestimable value of having a young cow we know is bred right for milk production, and it is quite certain no such animals could be bought for the price. There is a possibility, too, that 1s. 9d. a week is almost overestimating the cost of her upbringing, as she would graze out more than half of each year, and this is not expensive feed.

The Importance of Raising Stock.

The Wastage of Calves.

All the year round thousands of beautiful calves are fattened and killed in this country, realising but a very small price, and thousands of others equally good are killed at an immature age without fattening at all. Many of these calves are sired by first-rate bulls, and the produce of equally good cows. Surely there never could be a greater waste of money-making material than this.

These calves are chiefly bred in dairy districts where the one aim is the production and sale of the largest possible amount of milk, and immediately a calf is born it is simply regarded as a bye-product to be disposed of at the earliest possible moment.

Consequently huge numbers are sent into the weekly markets and far too many go to the butcher instead of to the rearer. This fact is still more serious for the future of our herds as the butcher generally buys the best calves which often come from the best cows, and thus the race of cattle is deteriorated as well as lessened.

Probably most milk-sellers and cheese and butter-makers would be glad to rear the heifer calves from their best milking cows, if they only knew that we had solved the problem of rearing, and that with the aid of our Milk Meal there was every chance of doing so successfully with very little milk.

The Milk Demand v. Supply.

Value of Milk for Human Food.

The demand for milk in the large cities and towns is rapidly increasing, as the people are being educated to appreciate its great value as human food. As a food for children the solids in new milk of good quality may safely be valued at one-fourth more per pound than the best meat, without bone. It has probably nearly the same value for men and women who have passed middle age. As food for young men and young women the solids in milk may be valued per pound at about

Part of a Bedfordshire Dairy Herd, all reared on Milk Meal.

three-fourths the cost of meat. In other words, when the value of the best home-fed beef, without bone, is 1s. per pound, the value of good new milk as food for children is nearly 5d. per quart, whilst for men and women in the prime of life its value as food is 3d. per quart, and after middle life new milk is a very cheap food at 4d. per quart. When these important facts become fully understood, and the great masses and classes, instead of taking tiny quantities with their tea and coffee, make it in various forms a substantial portion of their daily diet, there ought not to be a single acre of waste land in the kingdom, and the dairy farmer should be a prosperous man, especially as milk production is practically a British agricultural monopoly.

Condensed Milk Trade.

Another important source of demand which must not be overlooked, is the big export trade which is springing up for English condensed milk. Sufficient proof of this being the enormous factories which are situated in several good dairy districts, owned by the Anglo-Swiss Condensed Milk Co., Messrs. Nestle, and others. Therefore, in course of time, the inevitable law of supply and demand, together with the Dairy Farmers' Associations (which are doing a good work) must materially increase the price of milk.

Milk too Cheap.

Mr. Eustace Miles, M.A., the well known London expert in human food, in a recent number of the "National Review," boldly stated that the retail price of 4d. per quart was much too low for pure new milk, and said that if it was advanced 20 per cent. that its actual food value would then be as cheap as beef. He said that while a perishable food of such great bulk, and needing scrupulous cleanliness and care, yet great and urgent rapidity at every stage of its distribution, is sold at a rate so absurdly low in comparison with its less perishable sister product beef, the meagre profit of those who are engaged in the trade is almost equivalent to a direct pressure in favour of adulteration. With milk at a fair selling price, he further says, no hardship would be inflicted upon the farmer by raising the legal standard of fat to 3.5 as he would be encouraged to keep better cows and use better feeding materials, with the result that the whole population, and especially the children would materially benefit and the national physique would be improved in future generations.

We hardly agree with Mr. Miles that the retail price should or could be advanced, but we most certainly think that the farmer should get more for his milk, as the distributor or retailer is at present taking more than his due share of the profit.

Progressive Farmers.

But if the price of milk does increase there is another side, and that is, it will also augment the cost of rearing calves, if brought up in the ordinary way. It is true some progressive farmers have adopted new methods, but a large number, it must be confessed, follow the old expensive plan of giving nothing but valuable new milk until the calf is sufficiently old to be weaned, and in this respect they have something to learn, for a knowledge of the chemistry of food now makes it possible to rear young animals on artificial food to perfection.

This knowledge has for a long time past been put to practical use by several manufacturers for the benefit of the human race, in the form of several excellent infant and invalid foods.

Artificial Rearing Foods.

Of course, there are farmers who argue that hand-rearing with Milk Meal is more trouble, but they evidently forget that no money is saved in farming in these days without work and energy. It is also surely unnecessary to state that it is the worst possible policy, from the dairy point of view, to allow a good cow to rear her calf, as it invariably spoils her for milk production.

Tuberculosis Prevented.

Another vital point in favour of hand rearing is that tubercular infection by the cow's milk can be prevented. Professor Behring the famous authority on the subject, says that by removing new-born calves at birth from infected mothers, and bringing them up on disinfected or tubercular-free milk and other food that the disease can be prevented, and that the same practice applied to mankind would be as efficacious as in the case of cattle;

Management of the Cow at Calving.

We are desirous of making these notes as complete as possible, so a few hints regarding the treatment of the down calving cow are necessary. All practical men are aware that to give full and exhaustive instructions during this all-important period would need more space than we have here at our disposal. So we must endeavour to convey our remarks and advice concisely.

Period of Gestation.

The length of time a cow goes with calf is generally put down at forty weeks, but in most cases it is a week and sometimes two weeks more. The anticipated event should always be carefully calculated beforehand, and entered, not only in the owner's herd book, but on a stout cardboard which should be hung up in the cow house to serve as a reminder and to show when the cow should be "dried off," or no longed milked.

This period of lying dry is very essential for the future welfare of the cow and it largely influences her future capacity for filling the pail. The old adage of "all work and no play" has no more fitting application than in this case, for nature demands her resting period in animal as well as plant life, and if the milk producing cow does not get her proper rest or period of "off lying," her milking capacity will be seriously impaired. We advise a total rest of two months between the time of her being quite dry to her next calving and she will then be strong again and possibly enabled to increase her supply of milk. As the all-important and sometimes anxious (especially in the case of heifers) period of calving draws near the indications of which will be noticed by the watchful attendant, the cow should be separated from the herd and put into an enclosure or paddock where attention can be given her. The general practice, however, is to calve her in a large loose box which allows plenty of room for herself and her off-

Useful Stimulants and Laxatives.

spring, and where everything can be done for her fully and well during this delicate time. In a state of nature it may be said that animals require no shelter or care during parturition, but it is obvious that the cow of the present day is a highly domesticated animal and there will always be cases which require man's experienced help and treatment. For instance in all protracted cases of labour the cow should be supported with stimulants and nutrients, none being better than good warmed ale or whiskey and milk; and after delivery a dose of laxative medicine combined with a stimulant should be administered. For this purpose a pound of Epsom Salts with one tablespoonful of powdered ginger in warm water is excellent.

Upon the birth of the calf the cow should be allowed to lick it, and if this natural and instinctive act is prevented, the omission is damaging both to the mother and offspring.

The act of licking affords a healthy stimulus to the nervous system of the mother, and it most certainly assists in restoring the equilibrium of the circulation while it dries and stimulates the skin of the young calf and thus ensures the free contact of the air, which acts as a stimulus to the muscles of respiration thereby ensuring perfect inflation of its lungs. If this is not brought about a portion of the lungs may remain in a collapsed condition and in this way the foundation of future lung mischief laid.

The Cause of White Scour.

Recent scientific research has also established the fact that serious maladies in the young calf are often caused through the want of paying a little attention to its umbilical cord. Professor Nocard has proved beyond doubt that the fatal White Scour is caused by bacilli which enter the system through the wound caused by the breaking of the cord, and septic inflammation, navel-ill, and other serious troubles are also the possible outcome of neglect of this part. All these evils can be avoided by the simple precaution of tying a piece of carbolized silk or twine round the cord immediately at birth or as soon thereafter as possible and by freely applying carbolic oil to the whole of the calf's navel to prevent the absorption of the hurtful germs.

Reared on Milk Meal on the Warren Farm, Stewkley.

How long a calf should be suckled by its mother is a question of economy and requirement. In the case of valuable pedigree calves where the value of milk has no comparison to their value, or with calves required for veal, they are generally suckled and weaned or finished off by their mother. But in the case of cows intended for dairy purposes and where the calf is a secondary consideration, it is a common practice to remove the calf immediately it is born; and the reason given for doing so, is, that to allow the calf to suck damages the mother and interferes with her milking capabilities.

There is no more mistaken idea entertained by stockbreeders than this, and there are absolutely no grounds for such a belief.

Reasons for the Calf to suck the Cow for a few days.

Professor Wally's (of the Royal Veterinary College, Edinburgh) opinion coincides with this, and he says that if the cow is required for dairy purposes, it can do her no harm to allow the calf to suck for the first few days, as thereby the secretory activity of the udder is stimulated, and not only is congestion, and as a result, inflammation of the organ warded off, but milk fever is, to a large extent prevented.

Moreover, the ingestion of the first milk secreted (called colostrum) is a necessity to the well-being of the calf, as it contains a natural purge which clears the young animal's bowels. Especially should a dairy heifer suckle her calf for some days as she generally has a hard udder, which takes many days to soften; and this softening process can be satisfactorily accomplished by allowing the calf to suck at intervals—the cowman having first withdrawn a portion of the milk. A soft udder is always considered to be a matter of paramount importance by all dairy farmers.

It may also be as well to state here that if the calf is to be reared by its mother, care should be taken to increase her diet in quantity and quality very gradually, as often a sudden increase of richness in the milk will scour the calf.

Milk Fever.

It should be understood that gestation and the bringing forth of young is purely a natural function, and is in no sense an illness, but the tremendous development of the modern dairy cow's milk secreting glands has exacted a costly penalty by bringing in its train the much dreaded disease called Milk Fever. So great has been the havoc and financial loss caused by it, that many a valuable in-calf cow has been sold by her owner much below her value, rather than he would undertake the risk of her "falling." But happily science has again triumphed over disease, and in this instance by the simplest possible treatment. The cause of milk fever is still unsolved, but probably it is caused by bacteria or ptomaines in the udder which cannot exist when exposed to atmospheric air.

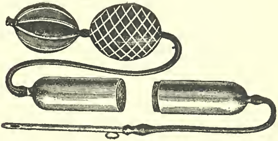
A Certain Remedy.

But whatever is the cause the remedy is certain, for it has been fully proved, both in this country and abroad, that the introduction of pure filtered air into the udder will cure in practically every instance. Injections of oxygen gas and various chemical fluids have been tried, but the air treatment has generally been found safer and more successful, and with no subsequent complications which sometimes follow the use of the other remedies.

It is so simple and inexpensive that the farmer can apply it himself as soon as the cow falls; and it is important that he should then do so, as the treatment is easier, and the recovery quicker if carried out without delay. It is, however, well to state that the utmost cleanliness of the hands, and the apparatus used is most important, or otherwise it will be much safer to ask a veterinary surgeon to apply it. The method of treatment is to gently pump air through carbolized cotton wool into each quarter of the udder until it is fairly distended, and carefully knead each quarter after the air is passed in.

Method of Treatment.

In a few cases it has been found necessary to repeat the injection twice, and even rarely a third time, but if persevered with apparently hopeless cases will recover. For the operation, a small india-rubber air pump and filter, called a Milk Fever Outfit, is necessary, and we have arranged with a well-known firm of scientific instrument makers to supply us with the latest and most up-to-date apparatus, which we can offer to our customers at 11s. 6d. complete, carriage paid. We may say that these Outfits are generally only obtainable by veterinary surgeons, so that this is an opportunity for the dairy farmer which he should not miss.

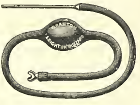


Brantom's Milk Fever Outfit,

Complete in Wooden Case, 11/6.

Simplicity is the keynote of the treatment, and the outfit is perfectly easy to use and understand. The oblong metal cylinder, called the filter, is filled with fresh carbolized cotton wool, the thin silvered tube or teat syphon is then passed carefully into the teat, and by pressing the bottom rubber ball, the air is gently pumped through the filter, and into the udder. There are no expensive drugs to buy, and the first cost is practically all.

Injection of Potassium, Iodide, and Chinosol.



Udder Syringe, for cure of Milk Fever and Garget. 6/-, post free.

The treatment by the injection of antiseptics is very much favoured by some, especially when it is carried out by the cowman as the nature of the injection generally ensures the instrument being in a safe antiseptic condition. For the purpose a simpler syringe is used, as illustrated, which we supply at 6s., carriage paid, and the injection to be used consists of six drachms of iodide of potassium and one drachm of chinosol dissolved in eight ounces of water, of which a fourth part, with half a pint of warm water, is syringed up each teat. Much care is necessary to keep the instrument clean, and the mixture diluted as above directed should be passed through it, and the metal end well washed with it before passing into the channel of the teat, otherwise it may introduce septic matter and make a bad bag afterwards. The object of the chinosol is to prevent such septic infection. After the mixture has been syringed up, the operator should pump in some air, and finally hold the teat a minute or two and knead or massage the bag so as to distribute both the mixture and the air equally over the udder. No special after-treatment is needed.

Money Makers and Life Savers.

These new remedies will probably enable the best cows to give some 25 to 50 lbs. of butter more in the year, as it will not be necessary to starve them so much before calving. This amount of butter will bring in a considerable sum, and further, this new treatment will prevent the serious loss of some of the best cows when they are at their most profitable time, and still further will make skilful breeding more easy, as the best cows may have only given three or four calves before being fatally attacked by this disease, and these calves may have been sold or killed, for it is not until a cow has had three or four calves that it is possible to know how good she may become.

It is quite unnecessary for us to further enumerate the many great advantages of the Milk Fever Outfit and Syringe, and we feel certain that stock-keepers will see the importance of keeping at hand one of these really valuable life-savers.

When to Rear Calves.

Calves can be successfully reared at any time of the year on our system; and as their birth is simply a question of the most profitable time for their mother to calve, the time for rearing can be decided according to the owner's convenience or his methods for disposing of his milk. Cheesemakers, for instance, require spring calvers, and so do also dairy farmers in the neighbourhood of a seaside or summer resort where there is more demand for milk in summer than in winter; but generally speaking everything tends to make autumn and winter the most favoured time for calving and rearing.

Autumn Calves versus Spring Calves.

There can be but little doubt that the latter part of the year is the best time to have heifers "come in." In the first place they do not require to be so well kept during the preceding winter, as during that time they will only be in the very earliest stage of pregnancy, and during the time that they require the most support, both for themselves and the unborn calf, they are on the pastures getting, or ought to be, their fill of grass. They consequently come down calving in autumn full of flesh and hair, and generally bring forth a strong healthy calf, and the expense beyond the rent of the grass they have run on during spring and summer is practically nothing.

Now, with spring calvers their period of pregnation is during the winter months, and young heifers carrying their first calf cannot and must not be made to rough it. They must be well cared for during the winter months, or else they come down in spring weak and poor, producing a small and puny calf, and making a poor bag as well. There must be, therefore, considerably more expense in calving down heifers in spring than in autumn.

Another point in favour of the autumn calver is that milk is worth more per gallon, and until winter really sets in the yield need not necessarily be much less, if any, than in the spring. There is consequently a greater value by at least £2 a head on the autumn calver over the spring calver. A useful heifer that in spring with a calf will fetch £15, will fetch £17 in autumn if she comes down with a nice bag; and then, again, the calf is worth more either to sell or to rear.

Autumn for Rearing.

There are also several reasons why the time is suitable to commence the rearing process. In the first place the calves become strong and fit to be turned out to grass the next summer. Another reason is that during the winter months more time is spent by cattlemen around the homestead, and more attention can be given to calves and other young stock than during the summer months, when all possible help is needed in the fields. Then if the calves are milk-fed the milk is less liable to go sour, and if Milk Meal is used boiling water can easily be obtained with which to make the gruel.

A further advantage is that the autumn or winter calf comes in well for stall feeding at two years old or grazing out at from two and a half to three years old, which is as early as the Northamptonshire and Leicestershire graziers usually finish cattle.

Suitable Calves for Rearing.

A word of guidance perhaps would be useful to the beginner, as some judgment is necessary in selecting calves—supposing they have to be purchased—and this a novice would hardly be likely to possess. The calves should have a good coat, and, if they are shorthorns, a roan or red colour is to be preferred. They should have good backs, open shoulders, and carry a good head if they are ever to make bullocks. Another thing that must not be lost sight of is that it never does to be particular to a few shillings or even a sovereign in the price of a calf. It will often mean a difference of three or four and sometimes five pounds in the bullock.

It is also a most valuable guide to the buyer of calves to know the herd they have been bred from, as then he can, as a rule, judge their characteristics. The writer would far rather give three pounds a head for calves from certain districts, and out of certain herds that he knows, than thirty shillings for some that are apparently useful, but which he knows are unreliably bred. Therefore, a farmer cannot be too careful in the selection of his calves for rearing, and as rearing is not conducted without considerable expense in food and labour, it stands to reason that the raising of poor cattle only ends in loss.

Poor Bulls mean Poor Calves.

If, for instance, his idea is to rear good store cattle then it would be suicidal for him to buy calves from a dairy farm where the bull is only looked upon as a means to an end, and where any sire is used so long as he is cheap enough. It is a blot on our national industry that there should be stock-keepers with such extremely narrow views of their position who thus knowingly deteriorate our race of cattle; and if the embargo against foreign imported store cattle is ever

A good lot of Yearlings, reared on Milk Meal by our esteemed customer G. H. Harris, Esq., Long Moor, Aylesbury.

removed it will largely result through this policy, or in other words through our home-bred store cattle not being good enough for the economical and proper production of beef. It is also really shortsighted policy for the cowkeeper's own pocket, for if on the other hand he once got the reputation for using well-bred and well selected sires he would find no difficulty in selling his calves that would repay the extra cost with 100 per cent. interest.

If dairying is aimed at, or the sale of in-calf heifers, cow-calves will be needed, and they are almost invariably more expensive than bull or steer calves. The latter being cheaper are more suitable for the feeder and grazier's purpose.

The dual purpose animal, adaptable for both milk and beef production, is now being largely bred on up-to-date farms, and if the rearer can secure calves from such stock he cannot do better.

In calf rearing and cattle feeding it need hardly be remarked, if there is to be any profit in the business it is much more likely to occur with good animals than with bad; with animals that can increase two pounds per day rather than with animals that, at their best, can increase but little more than one. The animal that thrives and makes good use of its food costs no more in shelter and labour and food than the animal that does not, and a bad "doer" like a poor milker should be speedily ejected from the herd.

Rearing the Calf.

From the calf's standpoint it may perhaps be conceded that there is no method of rearing a calf equal to the natural one of allowing it to run with its dam. But at the present time, when the production of milk for sale is recognized as one of the most profitable sides of British farming, this simple plan of calf-rearing, at least with the dairy breeds of cows, will not pay. With the poorer milking breeds of cattle, such as the

Rearing on New Milk too Expensive.

Herefords, Galloways, Highlanders, &c., calves are still frequently allowed to run with the cows, but in such cases the farms are mostly or entirely in grass and hardly adapted for winter dairying, while the calving occurs in late spring or early summer when grass is available, and the cows are cheaply kept. Still, when it is considered that as a rule a calf requires six quarts of new milk a day, the wholesale value of which is ninepence, while the market value of good stores of a year old allows approximately for only half this daily outlay (say, first value, £1 10s., and 365 times $4\frac{1}{2}$d.—£6 16s. $10\frac{1}{2}$d.; total, £8 6s. $10\frac{1}{2}$d.), it will be seen that new milk continued for long is far too expensive a calf-food; in fact, at the rate of ninepence a day a calf is costing more to keep than a heifer near to her time of calving. Moreover, calves can be well reared as stores, and even well fed for veal with but a small consumption of new milk. In the case of pedigree calves, more especially the bulls, the higher anticipated sale prices generally justify the use of new milk up to even the age of twelve months; but good, well-grown bulls can be reared without much new milk.

Treatment at Birth.

The system of artificially rearing the calf must therefore be decided upon and the method recommended by any two stock-keepers will hardly ever be identical in every respect. As we have said, some take away the calf as soon as it is born, which we hold to be wrong, and some let it remain with the cow for a few days. The Board of Agriculture recommends the former, and says that if the calf is removed to its pen as soon as it is born, that neither the calf nor dam appears seriously to notice the seperation. Its navel is at once dressed with carbolic oil and the calf is then rubbed down with a wisp of straw, and allowed to lie covered over with straw till its mother has been milked. In the natural way, the calf would not suck the cow until it got well on its feet, and there need be no hurry for half an hour or so to give it its first meal when separated from the cow, in mild or warm weather; but in cold weather it is considered important that it should have a drink of warm milk as soon as possible. In all cases milk is given to the young calves at the blood-heat of the cow (101 deg. to 102 deg. F.) which is the temperature at which a calf would get it from the cow by sucking. Now by the time the milk has streamed through the cold air into the cold milk-pail it will be at least 10 deg. below this, and it is therefore heated, either by addition of a little hot water, or otherwise. It may be well here to give a special caution against serving milk too hot either at this stage or later; it is better to err on the side of not having it warm enough, than of having it really hot. In the feeding of the calf, as well as in all matters connected with dairying, the thermometer* should be used. This is infallible, while human judgment, or the test of the fingers, is not, or there would be fewer complaints of scouring calves due to digestive disturbances.

Calf's liquid food should be 102 degress.

But whether the cow suckles the calf or not it is absolutely important in every case that a calf should receive its mother's milk while the milk is in the "biestings" or colostrum stage—that is, during the first four or five days succeeding parturition. In this period the well-known expert, Professor Sheldon says "that some of the casein in the milk is in the form of albumen gradually becoming casein, and the milk at this time may well be supposed to contain some medicinal property, which is perhaps specially adapted in the economy of nature to the given calf of a par-

Colostrum.

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* For price list of thermometers see page 126.

ticular mother rather than to another one." At any rate the young animal ought to receive the colostrum during the few days as designed by nature, for while its whole system is so delicate and sensitive, colostrum is the most easily digested, and only suitable food, and it exercises an important influence in regulating the working of the digestive organs, and evacuates the foetal matter from the bowels.

Colostrum or "beistings" differs in many respects from ordinary milk, for it contains about five times as much albuminoid (lean flesh, hair, and other tissue-forming) matter, and nearly twice as much mineral (bone-forming, &c.) matter. Further, the albuminoid matter, instead of being mainly in the form of curd (casein), as in milk, is chiefly in the form of albumen (as in the white of egg), which will not curdle in the calf's stomach, and practically needs no digesting; it however, coagulates with heat, so that in warming "biestings," care should be taken not to allow it to get really hot. The old-fashioned custom of giving a new-born calf an egg is, therefore, unnecessary, for albumen is abundant in the colostrum already. In the course of about five days colostrum gradually assumes the character of ordinary milk. It sometimes happens that a newly-calved cow is sold a day or two after calving, or a calf a day or two old is purchased, or a cow dies from bleeding at calving, and no colostrum is available for the calf; in such cases a useful substitute for the first few days is made by whipping up an egg with half a pint of warm water, adding half a teaspoonful of castor oil, and stirring in one pint of new milk, for each meal.

Substitute for Colostrum.

In teaching the young calf to take its first meal, the two forefingers are placed in the calf's mouth, and the hand is lowered into a bowl of the colostrum (first milk), and, usually, the calf at once sucks away

Teaching the Calf to feed.

vigoriously, but sometimes a little patience is required before it discovers its ability to suck. A quart is sufficient for the first meal, and most calves readily take this amount, and many would take more if allowed. On the third day the use of the fingers can be discontinued, and the calf is made to drink from a small pail and by this time it will readily take about two quarts of liquid food at each meal, given three times a day.

Greedy Calves.

In a state of nature, or when running at large, though domesticated, it has often been noticed that a cow will never let her calf suck a big quantity of milk at any one time, particularly in the first few days. This is nature's check to the calf's greediness, and so it stands to reason that a calf brought up by hand should be allowed only a small quantity of milk at a time, and should have that little often, at all events during the first week of its existence.

Three Meals at least per day.

It is most unnatural for infant animals to go long without food during the day, and the daily allowance of milk or substitute given at two meals instead of at least three is often the cause of trouble with hand calves. On the other hand, of course, too much time cannot be given to the work, but three meals a day should be the minimum, viz., at 6.30 a.m., 12.30 p.m. and 5.30 p.m. until 2 months old, when the calf will be freely eating hay and other dry food.

Unchecked Drinking.

Unchecked greedy drinking is the cause of indigestion, wind, and general derangement of the stomach, and soon shows its effects by making pot bellied, unthrifty animals. The chief reason being that sufficient saliva has not time to be mixed and swallowed with the liquid. This, however, can be obviated by using an artificial teat with which we have successfully reared good calves; and so necessary do we regard such an appliance that we will in the next chapter treat the subject more fully.

Artificial Teats.

These can be obtained from any dairy suppliers or from ourselves at a cost of 1s. 3d., and they can be fixed on any utensil the rearer finds most suitable. Feeding through a teat is necessarily a slower process than pail feeding, but it generally amply repays for the extra trouble and time.

Teat Feeding not a Fad.

It should be well known that scientific men no longer regard teat feeding as a fad, and a very interesting paper, showing it to be almost a necessity for rearing calves by hand, has just been written by M. Bieler, who is Director of the Agricultural Institute of Lausanne, in Switzerland. The writer is a veterinary surgeon and holds a most responsible position, and we are glad to be able to give stockkeepers in this country the benefit of his experience. The theory he advances, and which we have every reason to think is quite correct, is that a calf fed from a pail does not feed in its natural position, and that this is often the cause of internal derangements which so often prove fatal. He says that "Diarrhœa or Scour is one of the most common ailments of young animals, and at times assumes not only a fatal but even an enzootic form. It may be due to some alteration in the state of health of the mother

A New Theory for Scour.

if the calf is still sucking, or possibly it may be of an infectious form, but it is amongst hand-fed animals that it is most commonly seen. When the calf is sucking, he is only able to swallow small quantities of milk at a time, and furthermore is obliged to stretch out the head and neck into such a position that each swallow of the milk passes direct into the abomasum. In the case of hand-fed calves the usual custom is to teach the animal to drink from a bucket, as if he were full grown. This is usually done at first by getting him

Teat Feeding on a Sussex Farm.

to suck the feeder's fingers in the milk, the bucket being rested on the ground, and the calf soon learns to drink, but the head and neck are not in the same position as they would be if he were sucking his mother, and also the swallows are larger, and a portion goes into the rumen, which in the young animal is not properly developed. It there undergoes decomposition, and the process being repeated at each meal, diarrhœa is the result. M. Bieler has frequently examined such cases after death, and invariably found lots of milk in the rumen in a state of decomposition. To remedy this he suggests that hand-reared calves should be fed by an artificial teat, which should be most carefully looked after. It should be made of the best vulcanized indiarubber, so that it will not tear when the calf sucks, and at which he can bite.

Artificial Teat the Remedy.

Both the teat, bucket, and whole apparatus should be kept scrupulously clean, and each time after use rinsed out, first with a warm solution of soda and afterwards with clean water. An important point to remember is that the bucket should be hung up so that the calf has to stretch out his neck and assume the same position he would do if he were sucking his mother." Although M. Bieler is probably not aware of it, a very clever contrivance called the Common Sense Calf Feeder has been brought out by an American firm which exactly suits his requirements. We may say at once, that when the appliance was put before us we recognized its great merit and promptly made arrangements with the manufacturers to hold a stock and supply our customers direct. We shall therefore be pleased to send one to any address in the United Kingdom for 6s., carriage paid, or a half-dozen case for 33s.

The Common Sense Calf Feeder.

As the engraving shows, the calf takes its food in the same position as it would from the cow; which, according to M. Bieler, is so highly important, and as this Common Sense Feeder has this advantage over every other artificial teat, we have no hesitation in fully recommending it. The price, viz., 6s., is not prohibitive, and considering the strong, durable nature of the appliance, we think it is cheap, and we certainly hope that calf-rearers will give the new feeder a trial for their own satisfaction and profit. *The Irish Farming World*, in speaking of them says, "These appliances are well calculated by their intelligent use on dairy and stock farms generally, to substantially diminish the amount of calf mortality for which certain parts of the country arse so notorious, and should, therefore, be extensively taken advantage of. The underlying principle of the whole contrivance is to allow the calf to take the milk gradually by suction, and thus ensure its proper assimilation, while it also has the effect of preventing waste. Having personally handled one of these Common Sense Feeders in order to see how they are put together, we have come to the conclusion that they supply a long-felt want. They are not in any way complex, and on account of their great simplicity are likely to become very popular."

WORKS BY STRAIGHT SUCTION HAS NO VALVE
GOLD MEDAL
NOT A PENNORTH OF POLISH ON THE COMMON SENSE FEEDER
LIFTS OUT
ADVANTAGES OVER A SCORE.
PREVENTS SCOURING
THE PAIL LATCH
MAKES FINER CALVES & BETTER VEAL
LIKE NATURES WAY
ITS NO TROUBLE & PAYS YOU BEST
MILK OR MEAL
STATE FOR WHICH

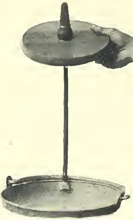
An Expert Opinion.

Brantom's Float Calf Feeder. (Patent.)

Economy of Teats.

The Evils of Unchecked Feeding.

We are quite aware that there have been thousands of pail and trough fed calves successfully reared without artificial teats, but we are also certain that they would have shown far more economical results for their owners had they suckled their liquid food through a teat. There is no more greedy animal than a hungry, vigorous calf, and when it drinks from a pail it usually goes at it as if competing in a Marathon race, and swallows the liquid in as few a number of swallows as possible, each time seeming to try to outdo its former record. The old proverb "More haste, less speed" was never more true than in this instance, for just as surely as fast eating causes indigestion in the human race so this fast drinking works havoc with the calf's progress by causing scour, pot belly, and all sorts of stomach troubles. Therefore it is readily seen that nature should be followed

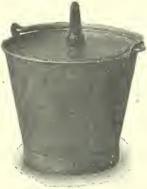


Follow Nature.

as closely as possible by using an artificial teat which supplies the food more slowly by suction and enables it to be mixed with the digestive juices in the mouth before swallowing. Of course teat feeding takes longer than pail feeding, but therein as we have shown lies its efficacy, and if a large number of calves are being reared a sufficient number of teats should be used to economise time.

The Cost of Calf Feeders.

The cost of practical Calf Feeders has hitherto been the greatest obstacle against the system being more generally adopted, and so we have just brought out and patented a durable and cheap appliance which we offer at nearly half the price of the well-known, useful American Feeder mentioned previously which we have sold for several years past.



Brantom's Float Calf Feeder.

As will be seen by the illustration, the Float Feeder is of most simple construction and therefore can be easily cleaned, which is most important. It consists of a thick rounded bevelled board, called the float; in the centre of which is fixed by a thumb screw, a bored galvanized iron casting. On the upper side of this is fixed the teat, and on the lower side an indiarubber tube with a perforated weight at the end. At feeding time the Feeder is simply placed teat upwards on the liquid food in the pail or trough on which it floats, and the calf will do the rest. Often when calves are taken from the cow they stubbornly refuse to drink until hunger compels them to do so, and a lot of valuable calf flesh is lost, but this simple Calf Feeder will prevent all troubles of this sort, and we have seen the most stubborn youngsters eagerly sucking the teat in less than a minute.

Worth its cost for Stubborn Calves Alone.

The Float Calf Feeder is a strong, durable appliance and will last a life-time with ordinary care, with the exception of course, of the rubber parts, which we renew at the following prices: teats with liners, 1s. 3d.; rubber tubes, 8d., post free.

Price complete, 4s. each. Half-dozen lots, 21s. One dozen lots, £2., all carriage paid.

Calf Meals or Milk Substitutes.

How long new milk only is to be fed to the calf must entirely depend on the individual requirements of the animal and the quality of the calf meal or milk substitute by which the economy in the cost of its upkeep is to be effected. A word of caution we feel is necessary here regarding the use of milk substitutes as we have known unscrupulous salesmen, especially in Ireland, impose on the credulity of the buyer by informing him that their commodity would rear calves from birth equally as well as milk. This we frankly state is impossible, for its mother's milk supplies a need during the first period of the young calf's existence which no other rearing food can equally fulfil, and our directions regarding the period for milk, and the gradual introduction of the Milk Meal diet are

"Equivalents" and "Lac" Meals.

the outcome of ripe experience, and should be carefully followed to ensure success. The stock-keeper is constantly approached by commission agents interested in the sale of milk substitutes, and is also confronted by expensive advertisements in every form, drawing his attention to "equivalents," and any number of meals beginning or ending with "lac," each and every one claiming to be perfect. And as we are manufacturers and inventors of what is admitted to be the most efficient milk substitute ever put on the market, we think possibly a few hints on the subject may prove instructive and helpful to the buyer. Milk is one of the most perfect foods provided in the chemistry of nature, yet in ordinary language there is but so much fat, casein, milk sugar, and ash, carried in solution in nearly nine times their weight of water, the average analysis being as follows:—

Composition of Milk of various Animals.

	Water per cent.	Butter (Fat) per cent.	Albuminoid Casein per cent.	Sugar per cent.	Salts per cent.
Human Milk ...	88·90	3·3	1·8	6·8	0·21
Cow " ...	87·0	4·0	3·05	4·8	0·6
Goat " ..	86·8	4·3	4·6	4·0	0·58
Ewe " ...	85·62	4·20	4·5	5·0	0·68
Mare " ...	88·0	1·0	1·6	6·7	0·5
Ass " ...	90·0	5·6	3·8	5·4	0·5
Sow " ...	82·6	5·7	6·2	5·0	0·5
Skimmed Milk	90·0	0·8	3·9	4·7	0·6
Buttermilk ...	90·0	6·0	3·0	5·4	0·6
Colostrum ...	75·1	3·5	16·8	4·6	
Cream (thick) ...	55·0	34·5	8·5	2·0	
Butter ...	10·0	87·8	1·0	1·2	
Cheese (rich) ...	40·0	30·0	25·0	5·0	

Some Makers' Exorbitant Prices.

But simple composition as it seems, the cleverest chemist cannot solve how to make it artificially for human consumption. It has, however, been proved in recent years that by closely following the various constituents of milk, they are able to produce milk substitutes for rearing young animals (and the human offspring also), which do the work successfully at about one-sixth of the price of new milk. There are now several specially prepared rearing meals or milk substitutes on the market, and one drawback to their use is the exorbitant prices ranging from 20s. per cwt. (£20 per ton) to 30s. per cwt. (£30 per ton), charged for them in most cases. One often wonders why stock-keepers pay these prices, but the fact remains that they pay huge profits to the manufacturers, and also for the elaborate and costly advertising, which is necessary to keep these enormously high priced foods selling.

Origin of Brantom's Milk Meal.

But something can be learned from this fact, and that is, calf meal at even these high prices must pay the rearer to use, or he would not use it. And reasoning thus, we experimented on numbers of calves for a period extending over two years, and in the end produced a rearing meal which we put before our customers as "Brantom's Cooked Milk Meal for Calves," at the fair price of 15s. per cwt., at the same time guaranteeing it equal to any other higher-priced meal. This price is the lowest a rearer can expect to obtain a thoroughly effi-

cient cooked food; and this last point we wish to impress on the person who aspires to be his own calf meal maker, namely, that the meal must be cooked in special and costly apparatus, to develop its nutritious properties, and render it easily assimilable, and to make it a safeguard against scour. Our production is thoroughly cooked, the indigestible, irritating, and insoluble portions are excluded, with the result that the Meal is extremely rich in flesh, bone, and muscle forming matter, and yet most easily digested.

Cooked Food Necessary.

We get proofs every day that it will do its work, and our customers always come again. It is not a roughly-ground hotch-potch concoction, depending for its sale on advertising or canvassing. But it is a scientifically-balanced Food, well cooked, and will actually prevent scour. It is produced by clean modern machinery, and is as **carefully manufactured as an Infant Food.** Finally it is the product of up-to-date experiments and careful study, and we guarantee it a **Perfect Calf Rearing Food.**

Scientifically-Balanced Food.

We would also point out that if a calf-rearing meal is to hold its place on the market, and secure the continued patronage of rearers, only the best of its several constituents can be used. And therefore buyers should steer clear of the rubbishy compounds which unknown and unreliable makers—who have no reputation to lose—attempt to foist upon them.

Rubbishy Compounds.

It is not difficult to devise from a table of food-stuffs a calf meal that shall closely resemble milk in its digestible constituents, but it cannot be done without at the same time introducing a much larger amount of indigestible matter than occurs in milk. The consequence

The Failure of Ordinary Calf Meals.

is that, usually, calves reared on home-made or ordinary calf meals are "pot-bellied," badly-grown animals, instead of having the well-grown, level-fleshed, and healthy appearance of milk-fed ones.

Milk Meal Calves on a Bucks Farm.

This question of indigestible matter, and that of choosing meals which will agree with the calf, constitute great practical difficulties, and large numbers of cattle rearers have found it more economical and wiser to use Milk Meal.

Home-Made Calf Meal.

While on this subject, perhaps the views of the veterinary authority, "Trent Valley," published in an important farming journal would be of interest. He says, in answer to a query how to make calf meal:—

"Nobody connected with British agriculture is more aware of the great importance of economy than myself, but I am also a believer in the principle that 'a cobbler should stick to his last.' That an intelligent farmer may make a good calf meal—'milk substitute is the better term to use'—is perhaps possible, but the chances are that he will not. The farmer—and here I wish to speak respectfully—does not possess an intimate acquaintance with the internal organs of the calf, and he has yet to learn that swallowing does not mean the same thing as digestion. Few calf-rearers, I fear, have realized that a calf's stomach is a most delicate piece of machinery, and that it is extremely risky to try experiments with it. I

The Calf's Delicate Stomach.

am a believer in self-help, but I do not believe that the calf-rearer is putting self-help to good account when he embarks on the task of making a calf meal for himself. If 'W.H.W.' wishes to make experiments, I should be sorry to interfere with his intentions; but if he wants to rear calves in the cheapest way, and, like most rearers, cannot spare the necessary milk, then I advise him to buy a good calf meal, and not trouble himself how it is made up. This plan of action will do him the most good, and certainly be cheapest in the end.—Trent Valley."

To this sound advice we cannot add anything, and so we will now proceed to explain

Our System of Rearing.

As before mentioned, we made costly and long-continued experiments to perfect our milk substitute, and the following rules we eventually adopted and found most successful.

For the first few days the calf should be allowed to suck its mother, as the gain and benefit is so great. Taking the calf from the cow causes some trouble, but if properly carried out, not so much as many think. The following is a good plan:—On the evening of the arranged day, after the calf has sucked, put it in a pen by itself, out of sight and hearing of the cow, and do not let her see it again. Next morning take a couple of quarts of fresh milk from the cow, and enough hot water to keep it up to the temperature at which it left her, and give it to the calf through the Teat-feeder. A little sweetened milk rubbed on the teat will quickly induce the calf to suck and forget all its troubles. If no teat is at hand, get someone to hold the pail while the feeder puts two fingers into the calf's mouth, and gently forces its nose into the milk. It may refuse to drink in spite of coaxing for there seems a great difference in calves about this;

Feeding from the Pail.

but if it does, take the milk away for some hours, when, being hungry, it will be more keen, and probably drink without much trouble, and soon learn to take its milk without the inducement of the fingers. But let it be fully understood that we strongly advocate the teat system as it is entirely against nature for a calf to drink its food unchecked.

An idea for holding the pails.

For the first week the calf must have only milk, and for the next fourteen days milk should remain its principal diet, and especially is this necessary in the case of a first calf as it is generally a weaker and smaller animal than those born of maturer animals, and requires its natural food milk, longer, and altogether more careful treatment. But if the calf is strong and healthy, and milk is scarce, after seven days a slowly increasing quantity of gruel prepared from Milk Meal, may be gradually mixed daily into its ration of milk in order to accustom it to greater changes of food later on. Of course, if the milk is available, this mixed liquid diet will prove particularly nourishing and helpful. But as this is not usually the case,

Calves' Appetites.

Over-Feeding Causes Trouble.

the new milk may soon be changed for skim mixed with Milk Meal to make up the deficiency in the feeding value. And after a time skim milk can be dispensed with, if it cannot be spared, for our properly balanced milk substitute will carry the calves along, and make them thrive and grow in a most marked manner. As to the quantity required, we certainly in our Milk Meal directions give advice, but it must be borne in mind that calves' appetites and digestive capacities vary a great deal, and so to feed by strict measurement does not properly meet every case. We advise the rearer to watch his calves closely, and always stop them when he considers they have had sufficient, but willing and anxious to drink some more. It should be an unbroken rule never to let them drink all they will or can, over-feeding on liquid food being the cause of stomach troubles, and half the ills the young animals are subject to.

We advise about four-and-a-half to six quarts per day for calves up to a month old, and six to eight quarts from a month to eight weeks old, eight quarts to ten quarts per day after that age given in three meals per day. The Milk Meal gruel being so very nutritious and costing so little money, a few quarts given each day to a calf will pay well even up to five months old.

Directions for Use.

Quantity of Milk Meal Required.

The quantity of Milk Meal required to each gallon of liquid all depends on whether separated milk or water is used, and, as a general rule, twice the quantity should be given when water is used, as the calf is then solely depending for sustenance on the

Milk Meal, and we certainly think when this is the case, that the quantity should equal the amount of the solids in new milk. We used to recommend a lesser quantity, viz.: 1 pint of Milk Meal to the gallon of water, and hundreds of calves have been thus reared, but it seems to us only reasonable to suggest that as a gallon of new milk contains about 1-lb. of solid matter in the form of fat, albuminoids, and sugar, that a gallon of water should have at least 1-lb. of Milk Meal therein to make it equivalent to new milk.

We therefore direct the stockman to use this quantity, viz.:—1-lb. of Milk Meal to a gallon of water, and his calves will benefit accordingly.

How to Prepare.

Mix one pound of Milk Meal with cold water to a smooth paste, pour on this paste sufficient boiling water to make one gallon of gruel, and stir thoroughly.

Give it to the calves when milk-warm, having again stirred it well. They should have the same quantity of gruel as they would of milk; this, of course, varies with the age of the animal, but the stockman must take care that they do not have too much or consume it too quickly.

Let the calves have all the milk for say the first week, and then begin mixing a little of the Milk Meal gruel in their milk, and thus gradually lessen the milk and give an increased supply of gruel until about three weeks or a month old, when they can be reared and fattened entirely on it.

How to Use with Separated or Skim Milk.

Separated or skim milk is a very useful article for calf-rearing, but as it has been deprived of all fat or cream it is quite insufficient by itself for the purpose. Therefore mix ½-lb., or a little more, Milk Meal to the gallon, which then makes up the deficiency of fat and other feeding constituents, and converts it into a perfect rearing food. It should be mixed in the same way as when water is used.

A New Method of preparing the Milk Meal.

As economy of time and fuel is a great item in calf rearing, we have lately introduced a new method of preparing the Milk Meal, which has been carried out with success by several rearers. In temperate and cold weather, when there is no danger of fermentation, we recommend it in preference to our ordinary directions, as it is quicker and less trouble. Take enough Milk Meal to make the requisite amount of milk substitute for one day, and mix with a little cold water in the ordinary way into a smooth creamy paste, then add more cold water up to about half the quantity required, and cover up the pail and let it stand till feeding time. In this way the Milk Meal is made quite soluble and possibly it is more digestible than if made quickly. At feeding time, simply make up the proper quantity with hot separated milk or hot water to bring it to the required new milk warmth, viz: 102 degrees and the food is ready. Keep the teat feeders and all utensils thoroughly clean and sweet, or stomach troubles may follow.

Active Digestion of Young Animals.

In the artificial rearing of young animals it should ever be remembered that their digestion is very active, but at the same time is of limited capacity, and consequently they should be supplied with food at short intervals, and not be allowed to overgorge themselves. The neglect of these precautions leads to indigestion, flatulence, and diarrhœa. Moreover, when they are allowed to become very hungry the food is bolted, and in consequence is not subjected to the chemical action of the saliva, and the calf loses flesh and condition rapidly. Calves which suck their mother also often suffer from these maladies without any assignable cause, but it is generally through something being wrong with the cow, which requires to be put right by altering her food, and by giving her corrective medicine.

Brantom's Food Spice.

Calves cannot be brought to maturity upon grain, meal, and milk, either singly or combined, as the sole feed, but must have some long forage, without which rumination is impossible. So begin to tempt them as early as possible to eat dry food, and especially hay or clover (which is an excellent food), which is much better than over-doing them with liquid. To do this effectively use a little good condiment, such as our Food Spice, which stimulates digestion, and sharpens their appetite. A great help also in this direction is Rock Salt, a lump of which should be constantly within their reach in both shed and field, as it increases the consumption of food and promotes nutrition. Cake can then be added to their daily food with great advantage, and undoubtedly a nice soft nutritious compound cake, such as Brantom's Feeding Cake, will suit them better than any other, but if another is chosen let it be a good linseed cake and never cotton cake, which is most unsuitable for their young stomachs, and very often proves fatal to them.

Crushed oats, bran, dried grains, malt culms, sliced carrots, mangels, and turnips are all suitable foods, and calves will also soon learn to eat a few beans or peas which they prefer whole to ground. We know several stock-breeders who regularly feed their young calves with grittled old beans with good results. One of the most important points to remember for successfully rearing young calves is that there must be no sudden changes in their solid or liquid food, for no other farm animal is so liable to stomach troubles. Any abrupt alteration in their diet, therefore, must be carefully avoided, and regularity in the time of feeding is also essential or their growth and condition will seriously suffer.

Shorthorn Calves reared by Mr. W. Watson, on the estate of our esteemed customer, L. de Rothschild, Esq., Ascott.

Never lose the Calf Flesh.

No other young animal will respond to good treatment more than the calf (and vice versa), and the aim of the feeder should be never to let it go off its feed or lose its calf flesh. By scientific experiments it has been proved to store up as flesh 69 per cent. of the albuminoids in its food, and assimilate at the same time 98 per cent. of the lime and 74 per cent. of the phosphoric acid. A calf will sometimes gain in weight as rapidly as a fattening ox ten times as heavy. These extraordinary rates of increase are due to the very large amount of food consumed in relation to the weight of the body; to the watery nature of the increase in a young animal and the small formation of fat.

Cost of Rearing. The cost of rearing a calf for a year under our system is approximately as follows:—Reckoning 1 cwt. Milk Meal to make only 120 gallons of milk substitute.

		s.	d.
For the first 2 weeks.			
70 quarts New Milk at 1½d. per quart		8	9
For the next 6 weeks.			
42 quarts New Milk at 1½d.		5	3
210 „ Milk Meal at 1½d. per gallon		6	6
For next 4 weeks.			
56 quarts Separated Milk at 1½d. per gallon		1	4
168 „ Milk Meal		5	3
Hay, Oats, and Bran		3	0
For the next 14 weeks.			
220 gallons Milk Meal and Separated Milk at 1½d.	1	7	6
Hay, Cake, Swedes, Crushed Oats		14	0
For the next 26 weeks.			
Hay, Mixed Cake, Crushed Oats, and Swedes	2	10	0
	£6	1	7

Bullock calves thus reared, easily sell at a year old at the local spring sales of store cattle at £8 5s. each, thus paying the *market* price (less the cost of marketing) for home-grown produce eaten, 6d. a gallon for the new milk, and 1½d. a gallon for the separated milk consumed, leaving £2 2s. for the first value of the calf and a small margin for risk. The manure produced is taken as a set-off against the value of attendance and litter. In the case of well-bred heifer calves intended for breeding the value at a year old would be considerably above this store price.

In rearing young bulls, the Milk Meal with the

Rearing young Bulls.

separated milk is continued for, say, six weeks longer than with other calves, and then is given alone to the end of the eighth month, at the same time doubling the quantities of linseed cake and meal. This involves an extra expenditure of 35s., while if the calf has been well selected at the commencement he easily realises £5 or £6 more at a year old than an ordinary store bullock of the same age.

Numerous practical trials, carried out in Belgium and elsewhere, show that the return per gallon of separated milk is frequently over 2¼d., and occasionally over 3d. But feeding calves on whole milk in Belgium is stated to show a tendency to disappear, as it is found not to pay. Twenty-two calves fed on whole milk returned under 4½d. per gallon for the milk consumed. At such figures farmers are well advised not to feed whole milk to calves, as it is not so profitable as other plans of utilising the milk.

Another Method of Rearing.

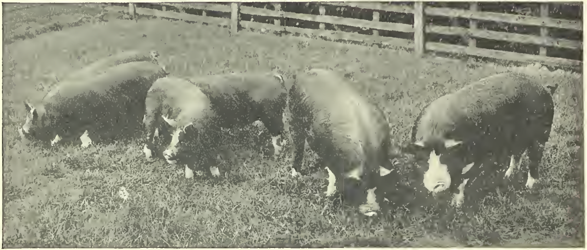
Our idea in publishing this booklet was to give feeders the best possible information and advice, and we therefore give details of another system which has been successfully followed by some of our friends. This method answers, and is especially adapted for those who buy in calves for rearing. By adopting this system twenty calves can be reared with the milk of only one cow (say ten quarts daily), for about as many weeks with the aid of milk meal. For instance, two or three calves a week old are bought to start with, and fed as we direct; in seven or eight days there is milk enough to spare to rear one or two more; in a week or so more a further one may be bought, and a fresh one or two every seven or eight days after that; and this process may be carried on as long as it suits the farmer's purpose; for as the calves get on to gruel entirely, enough milk will be left over every eighth day to feed a fresh calf.

Fattening for Veal

Milk Meal can be used with advantage.

The fattening of the calf for sale to the butcher as veal is quite a different matter, and in doing this no other food but new milk is generally given, as many butchers will have the white flesh of the milk fed animal; indeed, many object to veal calves that have been fed with solids. The best and cheapest way to make veal is to allow the calf all the new milk it cares to take and get it off to the butcher at the earliest possible moment. There is no economy in restricting the allowance of milk, for this prolongs the fattening process, and relatively more milk is required to produce a less satisfactory result. Where the quick and economical production of veal is the end in view there is no doubt that the milk is of most benefit to the calf when it is sucked direct from the cow. The calf should be kept in a small, well ventilated, scrupulously clean and well-bedded pen, and allowed to suck its fill of milk twice, or, better still, three times a day, anything in excess of its requirements being milked out by hand. If the calf is hand-reared an artificial teat should always be used and a good thick addition of Milk Meal gruel in the new milk can be given with advantage and economy, but of course it must be begun gradually as in the ordinary rearing. From six weeks to two months is the time required to make a good veal calf, and in most cases, especially if there are other uses for the milk, the younger animal pays best. Regular feeding three times a day is essential to success, and all its liquid food at a temperature of not less than 80 degrees.

Probably a month is as long as it is advisable to feed calves on whole milk on a dairy farm, or until they



The above is a photograph of a litter of pure Berkshire Pigs bred by H. S. Leon, Esq., Bletchley Park. The two pigs on the right of the picture were chosen by the bailiff, Mr. James Watson, for their colour points alone, for show purposes; and thinking that some Milk Meal might quicken their growth and progress, he gave it to them with the above remarkable result. As will be seen, the two pigs are twice as big as the remainder of the litter, and are a striking proof of the value of Brantom's Milk Meal as a food for young animals. They were awarded First Prize at the Royal Agricultural Show.

have reached about 160 lb. live weight, or 96 lb. of veal. This weight may be attained in a month, provided the calves are fatted as quickly as possible. An effort should also be made to have the calves fat at the time veal commands a high price; otherwise the returns from vealing calves on whole milk may not be at all satisfactory.

It is worthy of note that some recent experiments in Germany have proved that when milk is the sole food of a calf that the addition of a small quantity of salt in same facilitates the digestive process and the calf will thrive much better than without it.

Rearing other Young Animals with Milk Meal.

Other young animals, including foals, lambs, and pigs can be easily reared with Milk Meal, but the analysis of their mother's milk must be noted in the table on page 44, and imitated as closely as possible. As the Milk Meal is made on the basis of cow's milk, it will be necessary, for instance, in nearly every case, to add more sugar. Especially is it necessary in the case of making a milk substitute for foals, as mare's milk contains nearly three times more sugar than cow's milk.

Calf Rearing in Tropical Countries.

Where Milk Meal is esteemed.

A good reliable substitute for milk like our Milk Meal is nowhere more useful and more highly esteemed than in tropical countries, where milk is scarce and always at a premium. A good dairy cow is a valuable animal and so is her calf, but on account of the high market value of milk in, or near the towns, there are still hundreds of dairymen and stock-keepers throughout South Africa, the Colonies, and the West Indies who constantly kill off calves from good acclimatized dairy cows to the inevitable detriment of their herds.

Tropical Food Stuffs.

We hope this unprofitable and wasteful system will come to an end when they hear of, and have an opportunity of getting a supply of our speciality. By following the general rules and recommendations in this booklet, calf rearing with Milk Meal is just as simple in the tropics as it is in temperate climes, and the young calf can be speedily pushed on with the home raised foods, such as chopped sugar canes, mealies, chopped sweet potatoes and cassava, and cocoanut meal.

Jersey Bull Calf "Rajah," the property of our esteemed customer F. Gordon Davis, Esq., of Wellington, Cape Colony, who has kindly forwarded us the above photograph and a letter stating that he reared this bull calf entirely on Milk Meal, and has already taken several First Prizes with it at first class shows.

Colonial Governments assisting the Dairy Farmer.

The South African Government is now following the Australian Colonies, in giving special attention and help to the dairy industry throughout South Africa, as the importations into that country are still very large, which is contrary to economy when the resources of the country, if properly developed, would easily enable it to supply its home markets, and possibly do an export trade.

Milk Meal will also help him.

To do this the farmers in these countries should follow the methods so successfully practised in Great Britain, which we are endeavouring in this manual to make plain to them. We are particularly glad to state here that our big export orders show that the Colonial farmers are beginning to do so.

The Cape cow is cross-bred, but the foundation stock of the improved breeds were Frieslands, which remain dominantly Friesland still, although largely crossed with various British breeds.

Cattle in Africa.

The pure bred Friesland is still undoubtedly the favourite with the Dutch farmers, and there are a great number of pure-bred herds throughout the country, one of which is owned by General Botha, the late commander-in-chief of the Boers.

In the eastern province of the Colony, more particularly in the sweet grass veld districts, the Shorthorn is the most popular breed of cattle, especially with the English farmers; and where the conditions are favourable and there is abundance of food, this breed thrives and grows out well, giving the best average returns to the farmer where milk and beef are both considered.

Other Liquid Rearing Foods.

Skim and Separated Milk.

Although skim milk is somewhat richer in fat than separated milk, yet the latter has an advantage over the former in being perfectly fresh and sweet when given to the calves, and for the morning and evening feeds it can be mixed directly with its proper quantity of milk meal gruel, and needs no warming if separated direct from the cow. The froth or air bubbles, should be skimmed off before giving it to the calves, or it is likely to cause flatulence,

The limit of its value.

Separated milk being now a bye-product of almost every dairy, it is most important that stock-keepers should know the limit of its value for rearing calves. It seems unnecessary to say, that having been deprived of the fat or cream, it is a most ill-balanced food, and quite unfit by itself for the purpose, and yet we have known many people who imagined that a large ration of separated milk would make up any deficiency in the feeding value. No greater mistake could be made, for an excess of liquid food, as we have before stated, is most deleterious. In fact, so great is the havoc wrought by the injudicious use of skim or separated milk amongst calves in Ireland, that special attention has been given to the subject. The following rules by a veterinary expert have been published in the Irish farming press, and those who have sustained losses through feeding with separated milk would probably find it advantageous to adopt them.

1. House all calves dropped during the forthcoming season in an entirely different building to that hitherto used as a calf house.

2. Mix a suitable quantity of Milk Meal gruel or other wholesome food rich in fat, with the separated milk before giving it to the calves.

3. Give each calf a teaspoonful of bi-carbonate of soda in its drink once a week, during the first eight weeks after birth.

4. Watch the calves carefully to see whether their bowels are in a normal state, and to do that it would be advisable to tie them in pens or stalls at night.

Separated milk has a constipating effect on the bowels when fed in reasonable quantities, and if a calf becomes unduly constipated, give it a mild purgative without delay.

Buttermilk and Whey.

Buttermilk in certain districts is largely used for feeding calves, but unless cream is churned in a fairly sweet condition, the by-product cannot be recommended. Buttermilk contains, as a rule, slightly more fat than separated milk, but is generally poorer in solids other than fat. The practice of churning sweet cream is coming more into popular favour, with the result that buttermilk as a food for calves can be more generally employed with safety if mixed with a good milk substitute. In cheese-making districts the by-product is whey, which is a liquid rich in milk sugar but poor in other solid constituents. If, however, an easily-digestible food, containing a fair proportion of

Reared on Milk Meal by Mr. T. Latham, Oxon.

proteids and fat is mixed with whey, the latter acts as an excellent substitute for milk. It is almost unnecessary for us to add that the ideal digestible food for this purpose is Milk Meal.

Hay Tea.

June Hay the best for the purpose.

Another valuable liquid food is Hay Tea, and although we have known people ridicule it as useless, we have every reason to recommend it as an aid to calf rearing, especially when no milk of any kind is available. Professor Henry, in his invaluable book on Foods and Feeding, says, that Hay Tea for calves is an old-fashioned idea, but it is nevertheless a good one. The soluble nutritive constituents of the hay are extracted by boiling, and the extract is very digestible and has a certain feeding value. If the hay is cut early, the quality of the tea is better, and if mixed in the usual manner with Milk Meal, the gruel will be almost equal to that made with separated milk, and calves will thrive remarkably well on it.

How to make it.

A writer in a recent number of a well-known agricultural paper recommended its use as follows:—After milk, Hay Tea is a beverage that young calves are most fond of, and it suits them capitally. I learned of it through an old cowman who was most successful in rearing calves, and he attributed much of his easy success to the Hay Tea. The hay is put into a tank or cask, boiling water is poured over it, the steam is shut in till it cools down. It is then stirred, the hay removed, and the tea left. The liquid seems a little thicker than when put in, and is a rich brown colour. It has an agreeable aroma, and is inviting. It is not given as a substitute for milk, but as an addition, or when milk is discontinued and meal takes its place, often in a liquid form. The calf meal may be mixed with the tea instead of water, Calves often show an indifference to meal mixed with water, but I never found them fastidious with the tea blend. When animals are sick and off their feed, steamed hay is often recommended as both inviting, soothing, and nourishing, and if it improves the ailing, it is, I think, consistent to believe it will suit the somewhat delicate or tender interior of the calves. I must say, since employing the tea, our calves have been exceptionally healthy, and scour, which is one of the most common, as well as the most trying troubles, has given no anxiety. I need hardly say the hay used should be absolutely sweet. There must be no faking with bad hay, to make the calf believe it is improved in tea form, as, however young the calf may be, it will quickly learn better than that, and one of two things will happen —the tea will either be neglected, or, if taken, disturbances will follow. Another way of making it is to fill a thin bag with sweet hay chaff, and put it through the same steaming process, or boil it in the copper. The bag can then be easily taken out, and the chaff mixed with the cattle and horse food is therefore not wasted.

Bad Hay is useless for the purpose.

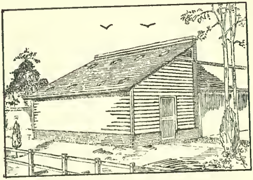
Proper Calf Houses.

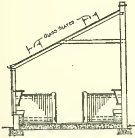
A properly constructed calf-house, with convenient little mangers, hay-racks, such as can be seen on Lord Rothschild's and other well-known estates, is a most valuable and necessary addition to a dairy farm.

The Board of Agriculture also recommends a specially built house and we give a plan and elevation of one according to their specification, but strongly advise the addition of windows on the south side, facing the sun as sunshine even if only for an hour or two on a winter day has a wonderful effect on young animals. The following is a description of same:—

Plan of Calf House

as recommended by the Board of Agriculture.





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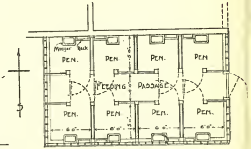


PLAN.

Scale - 4 ft. = 1 in.

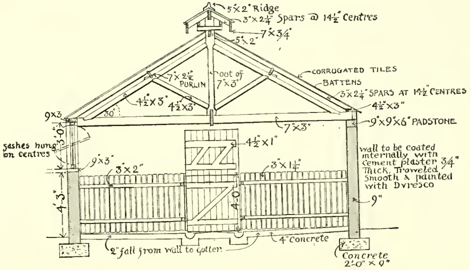
No Drains and no Draughts.

It should be a spacious lean-to building on the south side of a higher one, and lighted by means of single panes of glass at regular intervals in the roof. The floor should be of concrete, with no drains either open or covered. The door should be in halves for light and ventilation when necessary, and if a large house is constructed which requires two doors, they must be placed on the same side, so that there may not be cross draughts. For the same reason a ventilating louvre should be placed, as shown, in the highest part of the house, on the same side. The pens (6ft. by 5ft.) are placed on each side of a central gangway with board partitions not quite down to the floor, and palings in front, so that the calves may see each other across the gangway. Each pen must be fitted with a small trough and hay-rack.

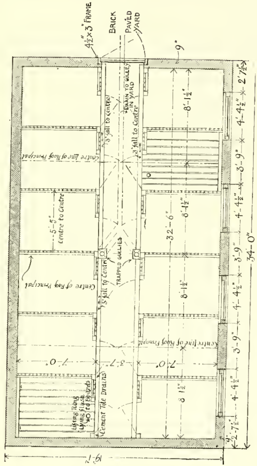
A Warm Bed Important.

Before a new-born calf is placed in its pen, the floor should be littered with an inch or so of well-broken moss-litter, and then covered with a fair bedding of straw. A little extra straw should be added day by day as required, and at the end of a week the pen should be cleaned out. A warm bed is all-important to calves. If straw is in short supply, moss-litter can be used, a bucketful being scattered on the top as frequently as it appears to need it, the pens being cleaned out about once in three weeks. Moss-litter is such a good absorbent and perfect doedorant that no offensive odour is noticeable, and no drains are required. When removed from the calf pens it is still too dry to place on the manure heap, but forms an excellent substance to place round the heap to absorb the liquid draining from it; when saturated, it is thrown on the top.

It will thus be seen that provision is made for comfortable and dry beds, sunlight and fresh air, while an incentive is given to exercise on the part of the calves



Plan. Section of Calf House. See next page.



Ground Plan.
Another plan of a Calf house, by kind permission of "The Farmer and Stockbreeder."

by the sense of companionship which they feel in seeing one another. These are conditions not difficult of attainment which might well be aimed at in the construction of every calf house.

It is well to state that the calf must never be in any way neglected, and should always be kept warm and dry with plenty of ventilation, free from draughts.

Loss of Heat means Wasted Food.

If young animals are exposed to the influence of a continued low temperature, a large proportion of the hydro-carbons of the food are used up in supplying the necessary internal heat, and are entirely lost by radiation, whereas in a fairly warm temperature much less would be used up in this way, and consequently more flesh and bone would be made without increasing the food or the cost.

Field or Shed.

As to turning the calves out to grass, this again must be left to the discretion and experience of the stock-keeper. The majority advocate keeping them in a yard for at least the first six months, while there are others who maintain they should quickly take grass as a supplementary food. Of course, the chief factor in the case is the time of the year when the calves are born. Those born in the spring and summer are not usually turned out that year, experience having shown that they thrive much better off the grass, escape the troublesome calf disease—husk or hoose—and deaths from blackleg are most rare, and they moreover turn out better stores the following spring. Our experience coincides with this, for although a certain amount of labour is saved if the calves are out on the grass, they invariably suffer from more juvenile ailments than when kept under cover during the first year of their birth.

Young Calves are better kept in.

In calf rearing, as in stock-keeping, the vitally important condition is the comfort of the animals. They may be the best stock in the country and they may be fed with the best selected foods, but unless they are thoroughly comfortable their owner's profits will be materially lessened. Discomfort is the great producer of poor calves, poor cattle, and poor milkers. Presuming that animals get plenty of good food the next great factors for success are shelter, dry beds, pure air, clean bodies, and regular meals.

Young Jerseys on the estate of our esteemed customer,
H. S. Leon, Esq., Bletchley Park.

It is sometimes argued that housing or sheltering makes animals delicate, while wintering out makes them strong. This is very doubtful. Undoubtedly shelter is of greater service to the weak than it is to the strong, but it makes neither any weaker, and wintering outside can scarcely make the strong or the weak any stronger. Our cattle are wanted to produce beef and milk, not for a military campaign, and as proper housing or sheltering will materially assist and hasten these functions, let the old-fashioned hardening ideas be relegated to the past.

Early Maturity—Keynote of Success.

Successful stock-raisers have learnt that the end to aim at, is to bring calves to their highest value in the least possible time. The animal's existence is, to all intents and purposes, a kind of race, and the quicker, in reason, this race is run the greater will be the prize. But the over-forcing of young animals for show or breeding purposes brings its own punishment in its train. It causes fatty degeneration of important organs, even at the early age of two years, in cattle; it means disappointment, in the form of sterility in the female or imperfect development of her offspring. Therefore, to force too early is a mistake, unless the calf is to be fattened for veal; but, later on, when the calf is getting strong and vigorous, it can be pushed on with a liberal diet of Milk Meal gruel, corn, roots, cake, and hay, for when it has reached this stage it can deal effectively with adult foods, and will, under favourable circumstances, make a most rapid growth, and quickly double itself in value.

Forcing too early is a Mistake.

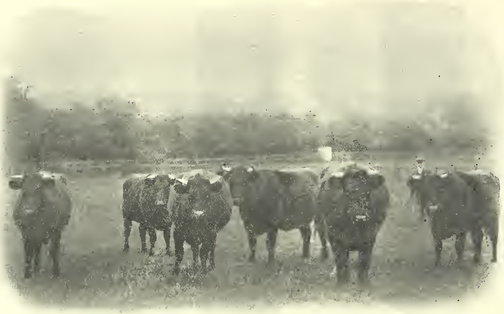
This, it must be remembered, is done at a comparatively trifling expense, because the young animal's capacity for storing away food is limited, and therefore it cannot eat a large quantity at a time. And so it behoves every feeder and rearer of cattle to take all means to save time and prevent waste, and encourage early maturity. It has been truly said that a stock-owner's success or non-success depends upon the measure of care and economy he exercises, not only in the feeding, but also in the management and treatment of his herd. As the old proverb says, "The eye of the master fattens his cattle," and all experienced feeders know the importance of individual feeding. The stockman must be a capable man, and he should study the requirements of each animal, and nourish it according to its wants, instead of placing all members of the herd on a certain fixed ration.

Good Profits, Quick Returns.

It has been clearly and decisively proved beyond dispute that the most profitable age to produce beef is under two years. In fact, the greater gain per lb. of food consumed has been shown, over and over again, to be in young animals; and yet how often one finds that though the knowledge of this important economical fact is common enough, its application on ordinary stock farms is far from being so. Early maturity means early selling, and surely a prompt return is as beneficial to the farmer as it is to his Cake merchant. The great obstacle against making money in agriculture generally, is that capital can only be turned over slowly, so no effort should be spared in promoting quick realisation where it is possible.

The Difficulties.

The difficulties in the way of anyone wanting to grow this early maturity beef must not be minimised, the greatest, perhaps, being that of obtaining a proper supply of good calves; then in forcing young animals in this way there is sometimes a risk of blackleg or quarter evil carrying one or two off, so that as a preventive two drachms of chlorate of potash should be given once a week in their food for a time to purify the blood. A well-known expert has for some years used chlorate of potash as a preventive of blackleg with most successful results. When the cattle are well over twelve months old the dose may be increased to three drachms twice a week for a few weeks. Linseed cake is also a purifier, so that by taking a little care and precaution there need be no loss on that score. The best time to have calves for this system is in the autumn. When early spring comes they are fit to wean from the milk, and can be kept in a good growing state on the principle mentioned above right through the



An example of Early Maturity. Two year old Lincoln Reds. [*Photo by G. Parsons.*

Bred by our esteemed customer, J. G. Williams, Esq., Pendley Manor, Tring.

summer, and when autumn comes are just a year old, and just right for five or six months' feeding through autumn and winter, and are ready for the butcher in the early spring, when they can be cleaned out and their yard room comes in for their successors.

Baby Beef a British Monopoly.

Shorthorns and Lincoln Reds, as well bred as they can be got, are undoubtedly the best sort of cattle for this system. They are big-natured and quick growers, and at from fifteen to eighteen months old will attain greater weights than any other breeds. They seem to adapt themselves to this process and stand high feeding at so young an age better than other breeds, and with less risk of loss. There is another point in favour of bringing out baby beef, and that is that for that class and quality of meat the Britisher has a monopoly. It is quite impossible for the foreigners to send over young stock of that class alive, and it is too young for their purposes to send as "chilled" meat. The great bulk of the foreign cattle are entirely grass and corn fed, in the open, and for that kind of feeding age is absolutely necessary. Whereas this system can be only adopted on root-growing farms with suitable accommodation. It is a system by which a profit can be made on breeding for beef even when beef is at a much lower price than at present; but whatever price beef or mutton may make, the quicker returns the breeder and feeder gets the greater must be his profits, and his turn-over also can be greatly enlarged.

The following actual figures of the cost of producing beef in some experiments carried out in Canada amply prove that it requires less food to make live weight increase in a young animal than in an old one.

The cost of producing 100-lb. live weight increase

Cost of Beef Production.

(bullocks)—Birth to six months old, 9s. 4d.; six months to twelve months, 17s. 1½d.; one year to two years, 22s. 10½d.; two and a half years to three years, 25s. 8½d.; three and a half years to four years, 34s. 3d., thus showing the decided advantage of getting bullocks ready for the block as soon as possible, rather than letting them reach three or four years of age before they are fit to kill.

Pure bred Shorthorns, reared by our esteemed customer, Sir Richard Cooper, Lichfield.

An example of a farm where systematic early feeding is profitably carried on has lately been quoted in the Journal of the Board of Agriculture, and the article is well worth repeating in this booklet.

The writer, Mr. H. Evershed, says the farm consists of about 300 acres, of which only 15 were in grass.

An Example of Early Maturity.

A few large deep milking cows were kept, and every year from 100 to 150 young bullocks went out at from 12 to 18 months old. In one year 170 bullocks went out at an average of 15 months (they ranged from 14 to 18 months, but very few were more than 15 months old). The average carcass weight of these 170 bullocks was 37 stones (of 14 lb.), which at 8s. a stone gives a value of £14 16s. each.

The calves were bought in, except the few from the above-mentioned cows, and the home-bred ones were found to do the best of all. For the first four weeks of their lives the calves had, on an average, 1½ gallons a day of whole milk, which makes a total of 42 gallons each. On this system calves must have some whole milk given them. For the next eight weeks 1½ gallons of liquid was given, made up of half new milk and half water or skim milk, and milk substitute. From the twelfth till about the sixteenth week pail-feeding went on even if skim milk were not available, for nourishing and palatable fluid was believed to be of great importance. At about 14 weeks old the calves would be getting 1½ gallons of skim milk plus one lb. milk substitute, or 1½ gallons of water plus two lb. milk substitute. This was gradually discontinued till at four months old the calves were on dry food, the best of hay having been supplied from the fifth week.

All through their first summer—that is to say, from the age of four to seven months or so—the calves were in boxes made in old barns, very little litter being used, the feeding being all the green fodder crops they could consume without scouring, all the hay they would eat, and from three to four lb. a day of best linseed and bean meal, half and half per day.

Six to nine months' autumn and winter feeding

Time to Sell.

followed, when they received per day ¾ to 1 bushel of cut roots, 4 to 6 lb. of cake and meal, and all the good hay they could eat. They were usually sold at about 13 months old, but if the market was against them, they were fed on, receiving a little more cake and corn, though never more than 8 lb. a day, till prices improved. February was found to be the best month for the sale of this small beef, though June and July were also very favourable.

Mr. Evershed states that the success of the system depends largely upon the men being made to take an interest in the animals, and that the beasts should be fed regularly and never over-fed at any one time. While calves are being pail fed their food must be kept scrupulously clean, and their stalls must also be kept clean and sweet, otherwise scour will spread, and then, he says, "good-bye to one's profit."

Foods and Feeding.

Ordinary Analysis prove very little.

It is most important for the stockman to know the value of the various feeding stuffs he gives to his cattle; and here, again, although the analyst can guide him to a large extent, there are certain local considerations which only experience of the land he is working can teach him. For instance, the hay or the roots of one farm may have a far greater feeding value than the products of another in the district, and therefore it would be absurd to recommend a fixed standard of rations for the needs of all growing or fattening animals. Further, it has lately been demonstrated that the analysis, as determined by the ordinary chemical process, does not by any means fully prove the feeding value of any particular food. Only that portion which the animal digests is available for the increase of flesh and bone, and the remainder passes into the manure heap. And until analysts recognise this cardinal fact, and give only the digestive analysis of feeding stuffs, the stock-keeper will be in the dark as to the correct value of any food. To easily ascertain this is one of the great needs of the present day. It can be done, as we ourselves regularly obtain these results; and when the farmer learns the truth, he will indeed open his eyes, and will wonder why such valuable information should not have been forthcoming long before.

Digestive Analysis all-important.

The well-known eminent analyst, Dr. Voelcker himself said in a recent law case, that the wooden desk he was standing at, showed by analysis a certain feeding value, but the stomach of no beast could extract and assimilate it. And this is absolutely typical of many feeding stuffs now on the market—their feeding constituents may be there, but they are so encased and surrounded with woody indigestible fibre, that their value as feeding stuffs is immensely over-rated, to the palpable loss of the buyer. It is exactly the reason that cotton cake is so fatal to calves. The feeding properties of the cake are contained or enveloped in 25 to 30 per cent. of woody and woolly fibre, which the stomach of the young animal is unable to deal with. The result is stoppage of the bowels, and death quickly follows.

Dr. Voelcker's candid statement.

Therefore it would be of very great assistance to farmers if a method could be generally followed whereby they could put a proper money value, not only upon the foods they buy, but also upon the foods they may raise and, so, readily determine which foods should be bought or grown at home and which should be shunned. A correct digestive analysis showing whether a food is actually dear or cheap is what is required.

The Food Unit Value.

The general rule now followed for ascertaining the values of foods is to take the figures of the ordinary chemical analysis and multiply the total amount of the oil and albuminoids by 2½ and add the product to the number of carbohydrates, the total being called Food Units. Thus a cake, for instance, which analyses 10 per cent. oil, 20 per cent. albuminoids, and 40 per cent. carbohydrates would show 115 Food Units as follows:—

Oil	10.0
Albuminoids	20.0
	30
	2½
	75
Add Carbohydrates	40
	115 Food Units.

But this method is thoroughly misleading as the whole of the albuminoids, fats, and carbohydrates are valued whereas they should be valued for the amounts of these constituents that are so to speak get-at-able or available for digestion. Thus it would be quite possible for another cake or food to be bought showing on paper a less number of Food Units, and yet more digestible, and therefore more valuable. For example, linseed cake contains less than rape cake, yet the nourishment an animal gets from the linseed as compared with the rape is very much greater, and therefore, when used for food they should have far different money values.

The more indigestible a food is the less nutritious are its digestible constituents and its price should

These Calves were reared on Milk Meal and gained First Prize at Thame (Oxon) Show.

Cotton Cake Over-rated.

depreciate accordingly. And so again although we do not wish to seem unduly biassed we think it can be truly demonstrated that cotton cake for this particular reason when it attains the absurdly high price it often does, is probably the dearest food the farmer can buy. The average analysis of cotton cake shows it to contain 22 per cent. albuminoids, 5½ per cent. oil, 30 per cent. carbohydrates, total 57½ per cent., but the estimated digestible percentage is only 40 per cent. Carrying these figures out into Food Units the totals work out 99 against 72 and estimating an ordinary Food Unit to be now worth 1s. 2d., the difference in the money values is as follows:

Value of Cotton Cake as shown by ordinary Food Unit calculation at 1s. 2d. per unit.	5	15	6
Actual digestible value	4	4	0
Difference	£1	11	6

An extreme example is also given by Professor Goodwin of Wye Agricultural College, regarding an article now largely sold for cattle feeding, viz., Cocoa bean husks.

These husks are somewhat similar in chemical composition to wheat bran, but were found, when a digestibility trial was made with them, to compare very badly with the bran as the following figures show:—

	Crude Protein. Per Cent.	Carbohydrate. Per Cent.	Crude Fat. Per Cent.	Crude Fibre. Per Cent.	**Food Units**
Cocoa Bean Husks.					
Total Analysis ...	16·1	46·0	8·2	13·4	**106**
Digestible ...	·7	35·4	5·7	4·4	**47**
Wheat Bran.					
Total Analysis ...	15·5	54·0	4·8	10·2	**91**
Digestible ...	12·9	40·5	3·7	2·1	**77**

Thus ordinary analysis would show that Cocoa husks were worth at 1s. per unit £5 6s. 0d., and bran

£4 11. od., whereas the digestive analysis proves that the former are worth only £2 7s. od. and bran £3 17s. od.

These figures are very striking and these illustrations alone should be sufficient to put the modern agriculturist on his guard against the value of foods as shown by ordinary analysis.

But not only is a knowledge of the true digestive value of a food necessary to the stock-keeper, but his experience must teach him the suitability of the foods he employs for his particular purpose. Analysis alone can be utterly misleading as can be shown by simply quoting the relative values of oats and bran. The Food Units of good wheat bran number more than those of oats, but what owner would dream of training his race horses on bran in preference to oats.

Digestive Powers of various Animals.

Further, it must be borne in mind that animals of different species do not always digest the same quantity of any given food. The greatest digestive power is undoubtedly possessed by ruminants, oxen being somewhat better than sheep as regards the digestion of straw or coarse hay. Compared with the ruminants the horse has an inferior digestive power, and in the case of such difficult digestible material as straw it can digest and utilise only half of what the former do, but the difference is far less marked with better feeding materials.

The pig digests coarse fodders considerably worse than does the horse, and experiments have proved that many foods regularly given to pigs, such as dried grains and other bye-products from breweries and distilleries, the pig digests very badly.

On the other hand with pigs and also with horses most probably sugar gives a much more favourable return than with ruminants.

All these differences are mainly due to the kind of digestive apparatus possessed by the animal as different breeds of the same species of animal possess an equal digestive power.

Value of Carbohydrates.

It may be useful to some to state here that under the new Feeding Stuffs Act, vendors of cattle foods are required to guarantee only the amounts of oil and albuminoids contained therein, and not the carbohydrates, as if the latter are of no value, and therefore, negligible. In practice, however, the very opposite is the case, as unless albuminoids are fed in the proper ratio with carbohydrates money can be easily lost, and therefore one is as essential as the other, and both have their definite money value. The popularity of good Compound Cakes is therefore easily accounted for, as they contain a large percentage of digestible carbohydrates—in addition to adequate percentages of oil and albuminoids—which combination stock-keepers have proved effective and economical.

Milk Meal Calves on a Cheshire Dairy Farm.

Mineral Constituents of Foods.

Then there is a group of constituents in food which are classed by analysts as "mineral matter," and their enormous importance to the well-being of animals is continually overlooked. These materials comprise:—

potash, soda, lime, oxide of iron, phosphoric acid, etc., and are absolutely necessary to animal life. If feeding an animal with food deficient in mineral substances is continued for some length of time, weakness and disease follow, and death ensues.

And yet, in view of this knowledge, the human race to-day is deliberately excluding from its staple diet—wheaten flour—the valuable mineral constituents of the wheat, and for the sake of having white bread it is bartering a measure of its physical growth and well being.

These facts easily demonstrate that minerals are a necessary part of the organism, especially assisting in the formation of bone and therefore they should be given to growing animals whose frames and organs are increasing in larger quantities than when growth has ceased. Common or rock salt embraces some of these important minerals, hence its usefulness for all kinds of stock. It also undoubtedly improves the appetite and increases both flesh and milk.

The desire and need for mineral matter is seen in wild animals resorting to " salt licks " and in domesticated animals eating soil and licking walls, etc. We therefore recommend in addition to salt that a lump of whiting should always be within reach of all animals. It satisfies their craving and at the same time is a useful anti-acid and helps bone formation in growing animals.

Land and Animals require Lime.

A deficiency of mineral matter in the land farmed by the stock-keeper himself is often the secret of his non-success with his stock and his crops also. For instance, thousands of acres of land in the United Kingdom to-day are hungry for lime, the application of which would restore their fertility and immeasurably increase the feeding value of their crops. The absolute need for this cheap yet marvellously useful constituent in soil is fully proved at the Woburn Experimental Farm by plots of land which have been cultivated and cropped for years until the lime has been exhausted, and although expensive manures, viz., nitrate of soda and sulphate of ammonia have been freely used thereon the plots are now unable to sustain any plant life and seed and cultivation are wasted. Another remarkable example of the value of lime on a farm used for the breeding of high-class Shorthorns has actually come under the observation of the writer, in the striking successes of the animals now raised there compared with the results before the lime was applied. This season alone eleven young bulls from this farm were sold under the hammer for £3,000, and the breeder, who is a member of a family now famous in the Shorthorn world, freely attributes a large measure of his success to the ample dressings of lime* applied to the land.

Of course it must not be understood that all soils need lime, but they invariably are deficient in some necessary constituent, and thus will be seen the need for analysing soil, so that whatever constituent it lacks can be supplied, with the utmost benefit to the crops grown, and the animals reared thereon.

Compounded Foods.

Compound Cake and what it is made of.

Owing to the great increase of milling capacity in this country, Compound Cake is now probably the most prominent feeding stuff. It is made of a variety of ingredients, as many as eight to twelve different foods often being used in its composition; the products of Linseed, Cotton Seed, Cocoanut, and Locust Beans generally forming the basis of the best qualities. Possibly this blended variety, and the process of steam cooking it undergoes during manufacture ensures and renders it more digestible than any single uncooked meal or cake. Science teaches us that cooking breaks up the starch grains, bursts the cellulose, and thus allows the digestive juices to come into contact with the granulose. At any rate, and speaking now only for our own manufactured cake, the new digestive analysis fully bears out this fact, and its suitability for stock (and especially for calves) is proved both in practice and theory. Unfortunately we are not able to supply all our Milk Meal customers with Cakes, as rates and freights for long distances make it impossible, but we shall be pleased

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* Should any difficulty be experienced in getting supplies of lime locally, we shall always be pleased to give quotations, carriage paid to buyers' nearest station.

First Prize Calf, reared on Milk Meal, Leighton Buzzard Fat Stock Show.

to give them our opinion of any similiar feeding stuff which they can obtain locally. We freely state that there are a few other manufacturers who also turn out excellent cakes, and so long as they continue to do so we shall have no hesitation in recommending stock-keepers to buy same when the market value justifies them in doing so.

Molasses Food.

Since the Government took off the duty from crude molasses for cattle feeding, the price has enabled practical stock-keepers to more largely use this useful article. Cane sugar molasses is of better flavour and is more suitable for cattle than that obtained from beetroot. The average analysis shows the former to contain 50 to 60 per cent. of sugar, and if the farmer will give the necessary time to mix it with some dry food, it proves an excellent feeding material.

The trouble of mixing it however, and the difficulty of handling the big casks in which it is imported, has enabled manufacturers to step in and offer various foods under fancy names, composed of some dry meal or fibre as a basis, in which a certain quantity of molasses has been absorbed or incorporated.

Some use peat moss litter as a basis, but we have yet to be convinced that such decayed fibrous material can have any special feeding value, even when it is masked with molasses. Nevertheless, there is no denying the fact that many stock-breeders have spoken very highly of this combination, and apparently from their experience it seems to have some latent property which expels worms from the stomach and intestines of animals to which it is given; and in this event it serves a most beneficial purpose. We recommend the feeder to use a mixed basis of clover chaff and malt culms, and well mix in same as much cane molasses as it will easily absorb. This mixture will cost him from £3 10s. to £4 10s. per ton, and he will find that he can obtain no better food of this class. It will prove a specially useful addition when roots are scarce.

Recipe for Molasses Food.

In the judicious blending of the home-grown foods of the farm with purchased foods lies the chief factor in the economical feeding of live stock.

Agreeable Flavour of Food helps the Feeder.

Finally, in feeding animals, there is a condition which cannot be expressed in figures, but which has a considerable influence on the effect of any diet; this is flavour. An agreeable flavour stimulates the appetite, and probably promotes digestion, and feeders should remember that a sovereign spent on a good condiment is probably well spent.

Dishorning Stock.

The Board of Agriculture has just directed attention to the enormous increase in the number of exported polled stock; and it views this development most favourably as polled stock or dishorned stock travel very much better both by ship and rail. It further advocates the practice of early dishorning, and as the operation, when performed at an early age with caustic potash, is painless and simple, there is no doubt that the practice will increase. Such powerful weapons for attack and defence as long sharp horns are certainly not needed by animals in a state of domestication, and their misuse by the more powerful animals causes cruel suffering to their companions when travelling and also in the stock-yard. Mischief is often done of a serious character even from a merely financial point of view, so we think our readers will appreciate a description of the process. Dishorned cattle seem, with the absence of power, to have less inclination to injure their fellow beasts; it is, therefore, only feasible to conclude that being more restful they will thrive better. The operation of removing the horns, or rather preventing their development, consists of procuring at the nearest chemist's establishment a small stick of caustic potash, moistening the point of the stick with a little water, and rubbing it in briskly over the spot overlying the horn base. The operation is best performed when the animals are about two or three days old, though it can be successfully done up to the time they are nine or ten days of age. In using the caustic potash care should be taken to wrap the end of it, which is held by the operator in a little paper, so as to protect the hand

Young Stock reared on Milk Meal in Devonshire.

With Caustic Potash.

of the operator from injury. In practice it is found that the most effective course of procedure is to first clip the hair off the portion of the skull on which the embryo horn is to be felt, and moisten the area over the spot with a little lukewarm water, to which a pinch of ammonia has been added. In moistening the seat of the horn in this way special care should be taken to prevent the water from wetting more than the exact area to be dressed. After the part has been moistened in the manner just indicated, it should be well rubbed with the point of the caustic potash stick, the length of rubbing depending upon the age of the calf, and the consequent strength of the skin underneath. A test as to when a sufficient amount of rubbing has been given is afforded by the effusion of a little blood. Some of our readers find that instead of rubbing the spot until the blood begins to appear in this way, it is better and less painful to rub at first for a period of 10 or 12 seconds, then allow a few hours to elapse, and renew the rubbing until the blood has begun to appear.

The following directions should be carefully observed:—

The operation is best performed when the calf is under five days old, and should not be attempted after the ninth day.

Caustic potash can be obtained from any chemist in the form of a white stick. When not in use, it should be kept in a stoppered glass bottle in a dry place, as it rapidly deteriorates when exposed to the air.

One man should hold the calf while an assistant uses the caustic.

Roll a piece of tinfoil or brown paper round the end of the stick of caustic potash which is held by the fingers, so as not to injure the hand of the operator.

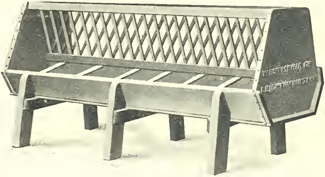
Do not moisten the stick too much, or the caustic may spread to the skin around the horn and destroy the flesh. For the same reason, keep the calf from getting wet for some days after the operation.

Be careful to rub on the centre of the horn, and not round the side of it.

Note.—Caustic potash is poisonous, and must therefore be kept in a safe place.

A Useful Hint.

A good friend of ours lost a valuable calf last season through it being cast in its manger, whereupon he promptly had the whole of the mangers barred at suitable intervals which of course will prevent any similar trouble. We regard it as a very useful hint for stockkeepers and append a sketch to show more fully the idea.



Calf Manger, barred across to prevent Calves being cast.

Ailments and Diseases.

Even on the best regulated and managed stock farms various troubles are constantly occurring requiring medicinal treatment, and although we strongly urge the desirability of skilled veterinary advice in serious cases, perhaps a brief description of the most prevalent ones, together with a remedy, may prove useful in trivial cases or in times of emergency.

Many of the recipes have been given to us by experienced stock-breeders, and for others we are chiefly indebted to Mr. Harold Leeney's book "Home Doctoring of Animals," and Professor Finlay Dun's "Veterinary Medicines," and if anyone requires fuller information than our space allows, we can recommend to them no better works of reference than these.

Scour is the earliest contagious malady to which young cattle are liable, the causes, being improper feeding, damp, bad drains, and debility. Wherever an outbreak has occurred, it is wise to thoroughly clean out, disinfect, and lime-wash the place. There are various forms of Scour, and all are serious maladies if proper means are not taken to check them. A most useful preventive is prepared chalk or common whiting, a large lump of which should always be put within easy reach of the calves. As soon as a calf begins to scour, or even before if it looks at all sickly, it should receive a tablespoonful of castor oil in warm milk. With this treatment the calf will often take the next meal heartily, but if allowed to run on unchecked, complications may set in which will prove fatal. An error in diet is probably the commonest cause of "scour." The important point is to check the disease in its early stages. To cure, give a dose of castor oil with 30 or 40 drops of laudanum added; or else two or three doses in the day of aromatic balsam oil in which an egg has been beaten, from two to three wineglassfuls of the oil per dose. This may be followed each day by a tablespoonful of chalk mixture, and the calf should be fed sparingly. The treatment generally recommended by professional men is as follows:—Give a dose of castor oil, two tablespoonfuls, to clear the stomach of all undigested and irritable substances, and then a course of "Calves' Cordial" or Scour Mixture, the following being the popular recipe for same: Prepared chalk, 2-oz.; tincture of catechu, 1-oz.; tincture of opium, 1-oz.; essence of peppermint, ½-oz.; water, 12-oz. Dose, two to four tablespoonfuls twice or three times a day according to size or age. If the malady is intermittent, a change might help. Try the following:—Bi-carbonate of soda, 1-dr.; compound tincture of chloroform and morphia, 4-dr.; liquid extract of Bael, 1-oz.; water to 6-oz. Mix. Dose, one or two tablespoonfuls twice a day. Daily doses of fifteen grains of alum in a gill of water sometimes succeed where more complex remedies fail.

Another excellent remedy is:—Bi-carbonate of soda, ½-oz.; sweet spirit of nitre, ½-oz.; castor oil, 4-ozs.; linseed oil, 4-ozs.; powdered gentian, ¼-oz.; powdered ginger, ½-oz. One dose for a calf.

The following simple remedy has been used on a well-known pedigree stock farm with success, viz., three tablespoonfuls of whisky and bi-carbonate of soda, and it may be given a trial in mild attacks.

Brantom's Scour Cure.

In cases of emergency a ready-made preparation is very valuable as it is often "the stitch in time;" and a simple remedy applied at the very outset of a disease is generally more effectual than a more potent drug or the adoption of a drastic measure, when the disease has become well-developed. Every stockkeeper, therefore, should keep on hand a supply of our Scour Cure, which is a most effectual remedy for diarrhœa, curd, and dysentry in calves, lambs, and other animals. It is sold in air-tight canisters from 2s. 6d. and will keep potent for years. See price list at end of the book.

Another Cure.—We are indebted to the advising Veterinary Surgeon to the University of Leeds, Mr.

Clarkson, M.R.C.V.S., for the following curative treatment:—

1.—Isolate the calf, if possible, so that it may be kept quiet and its progress watched.

2.—Give a dose of 1-oz. of castor oil, mixed with a little whisky and warm water, immediately the calf shows signs of Scour, and do not give food for at least half an hour after having given the castor oil. The whisky acts as a stimulant, while the warm water is a diluent and makes the viscid oil more mobile.

3.—Reduce the allowance of milk to half the usual quantity, and continue to give the reduced rations until the calf shows signs of returning health, when the milk may be gradually increased.

4.—Give each day from two to five doses of a medicine, according to the severity of the case. The principal constituent of this medicine may be Resorcinol, a mild antiseptic. When taken in small doses it tends to stop excessive fermentation in the stomach which accompanies this form of Scour. The checking of this fermentation is the first step towards recovery. It is claimed for Resorcinol that its use is accompanied by less of the evil effects that follow other antiseptics.

The foregoing treatment was very successful when the calves were promptly attended to.

White Scour.—The infectious form of diarrhœa proves more fatal, the mortality in some districts being alarming. Prevention more than cure is the primary object in attacking this disease, which is due to absorption of septic matter or germs by the open naval string —"impervious urachus"—therefore it is imperative that the treatment should begin here—first, by tying the naval cord immediately at birth with string or tape dressed with an antiseptic solution; secondly, by dressing the naval and a good surface around it with the same antiseptic, and then painting it with a solution of iodine 35-grs. to two pints of spirit, afterwards with collodion containing one per cent. of iodine. Stockholm tar does equally well, but, probably owing to its cheapness and simplicity, its antiseptic properties are not sufficiently appreciated. The calf stalls in sheds should be cemented half-way up the walls, and have a floor of concrete without any joint or crevice, as any other kind of floor is objectionable, the germs lodging in the joints or crevices no matter how well they have been cleansed and disinfected.

Washing the floors daily with a weak antiseptic solution should be resorted to. This is a potent factor in prevention of the disease. When the calf is "seasoned" the premises should be thoroughly disinfected and prepared for the reception of the next lodger. It is also advisable never to house healthy with unhealthy or diseased animals. The internal treatment consists of a good dose of castor oil, with or without lime-water, and careful dieting. One or two doses of the following mixture usually gives relief, and proves very effectual: Chlorodine, 2-oz.; bi-carbonate of soda, 2-oz.; æther, 1-oz.; sweet spirit of nitre, 1-oz.; water, 6-oz. A wine-glassful in boiled milk daily.

A few doses of sodium hyposulphite for a few days is recommended and proves beneficial. As the treatment of scour is often very unsatisfactory, it is of paramount importance that the principles of prevention and disinfection be promulgated. A few of the remedies used internally and externally in this disease should be kept ready in stock, for once an outbreak occurs it is difficult to state how far it may go. It has been known to go round a farm's stock till every calf has had a touch of it more or less severe.

Indigestion is an ailment which takes time to rectify, and in all probability is due to some mismanagement in feeding or improper food, although sometimes it is caused by calves sucking each other, which can soon be stopped by well wetting the parts sucked with a solution of aloes. As medicine, try powdered rhubarb, ½-oz.; carbonate of magnesia, 1-oz.; powdered ginger, ½-oz.; tincture of gentian, 1-oz.; infusion of camomile to 8-oz. Give two tablespoonfuls two or three times a day. A teaspoonful of finely-powdered vegetable charcoal twice a day may also be administered. Feed

Reared on Milk Meal by Mr. White, at Combe Hay Park, Bath.

in small quantities, on the little-and-often principle, so that the digestive apparatus may not be overtaxed.

Our Calves' Digestive Spice is a most useful tonic aid for calves suffering with indigestion. Its effect is gradual, but certain, and calves gain weight and condition, which is not often the case when drugs are given.

Every stock-keeper knows the mischief that digestive maladies cause in young stock. They rapidly lose flesh, and all food and attention seems wasted. The cause of the trouble is often very simple, and requires but a simple remedy to start the calf thriving again. We have therefore lately introduced this special Digestive Spice for this purpose, and we believe it is likely to prove a great help to all rearers of calves.

Cold or Catarrh is caused by sudden changes from cold to hot air, but more especially from pure to bad air and by draughts and exposure. The symptoms are fits of shivering, staring coat, running at the nose and eyes. To cure. Rub the whole region of the lungs, sides and frame with mustard, and strap on a warm rug to maintain a good temperature, and drench the calf twice daily with one tablespoonful sweet spirit of nitre and one drachm of carbonate of ammonia in a pint of warm milk. See that the animal breathes pure air, and keep it warm and comfortable and its bedding clean and dry.

Another drench for colds and coughs is the following: Spirit of peppermint, 1-drachm; oil of mint, 10 drops; oil of eucalyptus, 60 drops; aromatic spirit of ammonia, 1 fluid ounce; chlorodyne, 4-drachms. Mix together. Enough for four doses for calves or two doses for cattle, to be given in warm gruel or milk at intervals of twelve hours.

Fever Drink (useful in chills and colds in both horses and cattle, and for horses after a hard day's hunting).—Extract of Belladonna, 1-drachm; nitrate of potash, ½-oz.; chlorate of potash, ½-oz.; sweet spirit of nitre, 1-oz.; spirit of camphor, ½-oz.; solution of acetate of ammonia, 2-oz.; water, 8-ozs.

Husk or Hoose is a malady caused by parasitic worms in the windpipe and bronchial tubes, which are produced generally by the use of stagnant water or rough watery grass. To cure, drench with one wine-glassful of turpentine and two of linseed oil mixed, or try the following drench:—Oil of turpentine, 1-oz.; tincture of asafœtida, $\frac{1}{2}$-oz.; oil of caraways, 10-drops; linseed oil, 6-oz.; and repeat once or twice at intervals of three days. The reason of this treatment is as follows:—The turpentine, so peculiarly destructive to animal parasites when brought directly into contact with them, is taken up into the system, enters into every part of the circulation, and is recognizable in both the urine and the expired air. It is thus brought directly into contact with the lung-worms, which it either destroys or so disturbs that they are expelled by the cough, so that with the cause of irritation removed the bad symptoms gradually abate.

Another drench is—Oil of turpentine, 2-drachms; carbolic acid (pure) 20-drops; chloroform, 30-drops. This has proved an excellent worm killer, but some amateurs fail to shake it enough to ensure proper mixture.

The most effective cure is by intra-tracheal injection. There is no special art in this, and many stock-keepers, after seeing the veterinary surgeon's method, do it themselves. A needle syringe is used, and the following quantities of a well-tried mixture constitute the dose for a full-sized calf, less being required for lambs and small calves:—Oil of turpentine, 2-drachms; carbolic acid (pure), 20-drops; chloroform, 30-drops.

Prevention.—Salting the pastures heavily both in early spring and autumn is the best of all preventives which will eradicate the husk worms.

Actinomycosis, otherwise known as wooden tongue. This is caused by a fungus and chiefly affects the tongue and jaw-bone of cattle. The affected animal is unable to masticate its food, owing to the tongue and the membranes of the mouth having small tumours in or upon them and the hapless beast starves, unless fed upon food that he can suck up. Treatment with iodine if commenced in time is generally successful. Immediately, therefore, the disease is discovered apply a strong tincture of iodine to the broken sores or nodules. More important than the external dressings is the administration daily of large internal doses of iodine of potassium in solution, as the fungus cannot live in the same body with iodine in any form. It has been found that an average bullock of two years can take as much as $\frac{1}{2}$ or $\frac{3}{4}$ of an ounce daily in solution, mixed with his food or given as a drench but it is better to begin with half that quantity and work gradually up as soon as it is seen no bad effects follow. There is generally some loss of condition before the treatment is begun and in all cases it is advisable to feed liberally on soft food that can be easily taken up in the mouth. When the tumours are seen to be shrinking and the surrounding area resuming a natural appearance the iodine may be reduced by degrees and finally left off altogether.

Red Water.—Black Water, etc.—This disease is known by a variety of names, and the prominent symptom is the red, purple, or black colour of the urine passed by the affected animal. It is a dangerous malady as the animal if untreated will waste away and die. The new treatment for this malady recommended by Professor Thompson is as follows:—Give the animal fourteen to twenty ounces of salt in two quarts of gruel, and then place in front of it a large pail of hay tea or bran tea in which two or three ounces of bi-carbonate of soda are dissolved. This must be renewed as soon as the patient drinks it. It should to be followed by ten ounce doses of linseed oil to which are added one ounce of sweet spirit of nitre, and one ounce of balsam of copiaba and this should be repeated every twelve hours if necessary. Should the bowels not respond, small doses of Epsom salts—from three to five ounces—in warm gruel containing half pint of whisky, every six or eight hours.

Cleansing Drink for Cows.—Carbonate of ammonia, ½-oz.; powdered ginger, ½-oz.; Epsom salts, 12-oz. to 16-oz. Give in a quart of ale or gruel. Those drinks supplied by the chemist of a different colour are made from this recipe with a little colouring matter added.

Drying Drench.—The giving of ½-oz. doses of powdered alum daily, reducing it gradually to two drachms until no longer necessary, and at the same time reducing the richness of the feeding, and the frequency of the milking, will invariably dry off a cow without risk of danger to her own well-being, or of spoiling her udder.

Foot-rot and "Foul" Dressing.—Butyr of antimony and aloetic tincture of myrrh, of each equal parts. Apply after removing loose and decayed horn.

"Black" Oils.—Oil of turpentine and Barbadoes petroleum, of each 1-oz.; sulphuric acid, 1-drachm; best olive oil, ½-pint. This recipe should be mixed by a chemist.

Milk Fever.—See page 24.

Anti Milk Fever Drench. A useful preventive drench to be given in a quart of warm water at calving time is:—Chinsol, 1-drachm; ginger, ½-oz.; sulphate of magnesia, 10-oz.

Castrators' Green Ointment.—The recipe for the green ointment used in castration is as follows:—Verdigris, 1-oz.; Venice turpentine, 3-oz.; lard, 10-oz. Melt the turpentine and lard together at a low heat; stir in the verdigris until cold.

Teat Ointment.—Sores on the teats of cows are very troublesome on some farms, and the fact that it is more common in some localities than others may be accounted for by the difference in the soil, the feeding and general management of the cows, and the carefulness or carelessness of the milker. A simple and very effective dressing for sore teats can be made in any quantity required by putting 7-grains of chinosol to each ounce of lard. Deep cracks will heal more quickly if the teat is daily soaked in warm water and then dressed with a 10 per cent. solution of sulphate of zinc, and afterwards dressed with the above ointment.

Another Treatment.—Use a lotion composed of 2 scruples of sulphocarbolate of zinc dissolved in a teacupful of rain water, three or four times each day, and each time after milking apply an ointment made of carbonate of zinc 1 part, and vaseline 4 parts, thoroughly mixed.

Care should be taken to cleanse the teats before milking, or particles of the discharge from the sores may get into the milk, and if the disease be contagious or inoculable, as " cow pox," serious results may ensue.

Warts on the teats, which are such a common nuisance, are best removed by strangulation—that is, by tying them tightly round at their base with silk thread, making it tighter and tighter each day till the wart is dead and will come off. The place where the wart was growing should then be touched with a pencil of caustic to prevent any spread or re-growth from taking place.

Dressing for Broken Knees.—For a simple skin wound nothing more is necessary than fermenting the knee with clean water to wash out the dirt and grit and applying immediately some carbolized oil. If, however, a serious wound is made and joint oil is escaping, the services of a veterinary surgeon must be secured at once.

Blackleg is reckoned to be the most malignant disease, and is caused by a micro-organism in the blood, similar to the bacillus of anthrax, which is generally fatal. There seems to be no really effective remedy, and the quicker the miserable animal is disposed of, and the carcass destroyed by quick-lime or fire, the better for the farm and locality, as there is no disease more difficult to eradicate. In some districts calves are peculiarly liable to it, and therein the stockman must practice prevention, and avoid giving them food which contains a heavy proportion of albuminoid matter, and dress his pastures yearly with agricultural salt. The old preventive of setoning calves is still practiced, but is now pronounced by veterinary authorities as virtually useless. See page .

Lice are generally found on unthrifty and out-of-condition animals. A dressing of a solution of tobacco juice or olive oil will usually eradicate them. Another dressing which can be applied with a brush, is—paraffin 1-part, linseed oil 5-parts.

Ringworm is a highly contagious skin disease, and is easily transferred to human beings. To cure, it is essential to success that the crusts be broken down, and this may be done by washing with carbolic soft soap and a stiff brush, or by rubbing them with coarse sand-paper or an old nutmeg grater, until a raw surface is exposed. Those engaged in dressing the calves should wear gloves, and be careful to keep the arms covered, and to avoid touching the neck or face until a thorough disinfection has been gone through. As to dressing, a simple ointment consisting of one part of sublimed sulphur and three of lard will cure ringworm if applied with sufficient energy, but preference is generally given to more elaborate preparations. The following is an example:—Black sulphur, 4-oz.; oil of turpentine, 4-oz.; sulphuric acid, 1-oz.; lard, 1-lb. This remedy should always be prepared by a chemist. Another recipe which we have found effective is red iodide of mercury 1-drachm; powdered sulphur ½-oz.; lard 1-oz.

Mange is a contagious skin disease, caused by parasites belonging to the class of psoric acari. Cure:

(1) The affected patches on the animal's skin should be softened by washing with soap and warm water. After this has been done the parts should be dressed with one of the common mange dressings, such as spirits of tar, oil, and sulphur. The dressing should be applied twice or even three times at intervals of ten days. For the serious and rebellious cases above mentioned veterinary advice should be sought. (2) The litter from an infected animal should be removed each time after dressing, and the flooring and wood or other fittings should be well sprayed with a five per cent. solution of carbolic acid in water.

Lotion for Mange and Lice.—1-lb. Stavesacre seeds; water, 2-gallons. Boil down to 1-gallon. This is specially suited to young stock and pigs, and is safe for dogs and cats.

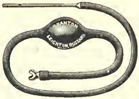
Another useful and safe receipe is:—Sulphurated potash, 1-oz.; glycerine, 4-oz. Water 46-oz.

Garget, Mammitis, Caked Bag, etc.—These troubles are caused by a variety of causes, and may be infectious but the general professional view is that garget is caused by deleterious organisms entering through the teat when the sphincter muscle is relaxed after milking or sucking and the cow lies down on dirt.

It often follows hurried and faulty "drying-off" which leaves the udder in a more or less weak inflammatory state and susceptible to any change in the cow's condition. Fresh diet, new grass, or changes in the temperature are pre-disposing causes, and the weakened udder quickly shows signs of any troubles caused thereby. Half the losses and troubles could be obviated if cows were "dried off" more slowly and a drying drench (for which we give a recipe) given as recommended.

Treatment.—Immediately anything is noticed amiss with the udder a cooling dose of medicine should be given for which the following is a suitable recipe:

1-lb. Epsom salt; 1-oz. ground ginger; 3-pints warm water. This should be given in one dose. The milk (or the changed fluid which takes its place) should be drawn and an injection of a suitable disinfectant sent up into the udder without delay. There is nothing better than a solution of 2 per cent. of chinosol with 7 per cent. of glycerine and water. The apparatus used for this purpose is illustrated herewith and is called an Udder Syringe which we supply at 6s. carriage paid.



Udder Syringe for cure of Milk Fever and Garget, 6/- post free.

This injection may be repeated night and morning, and after each dose the udder should be well and gently rubbed with melted lard. This treatment stretches the skin and thus affords considerable relief to the intense swelling. Camphorated oil should be also liberally used where there is very much pain. Nitre given frequently in small doses will tend towards expelling the harmful matter in the system, through the secretions, urine, etc., and a liniment of 5 parts of Olive oil to 1 part nitre emulsified by the aid of a small piece of soda, can be applied to the udder.

Another excellent method of treatment is by applying a dressing to the udder composed of 1 part Potassium Iodide to 7 parts of lard and give the cow internally 30-grain doses of Potassium Iodide twice a day—night and morning. In many cases of garget the passage is blocked, and every effort must be made to clear same and if necessary by introducing a teat syphon to clear the duct. Early neglect leads sometimes to such a degree of inflammatory action, that the whole quarter dies. A lost quarter is a very serious detriment and greatly reduces the value of the cow.

Hoven.—Cases of hoven or "blown," among cattle, are not at all uncommon in the early part of the season when the animals are first turned out to fresh grass. This disease is of specially frequent occurrence where the animals are given access to fields in which clover is present in any quantity. It also frequently arises from the carelessness of attendants in supplying house-fed cows with too much freshly-cut clover until the animals have become accustomed to it. If taken in time, ordinary cases of hoven can be satisfactorily dealt with by the administration of certain medicines calculated to arrest the fermentation going on in the stomach. For this purpose there is no better drench than sweet spirits of nitre, 1½-ozs.; sal volatile, ½-oz.; tincture of ginger, 1-drachm; water, 1-pint. This should be administered with as much expedition as possible as the great secret to success in dealing with this disorder is to arrest the generation of development of the gases in the stomach.

Another good Remedy which will not give any bad after effects of any consequence, and saves tapping the cow, is 1-oz. English oil of pepper-mint; 1-lb. Stockholm tar; 1-lb. bi-carbonate of soda; mix well together, open cow's mouth, pull the tongue well forward, and give two teaspoonfuls, when the cow will receive instant relief, and suffer no after effects.

In extreme cases, of course, the only method to pursue is to puncture the rumen with a trocar, and allow the gas to escape in this manner. In cases of emergency relief has been given with any ordinary knife.

Wounds.

There are four kinds of wounds—namely, clean cut, torn, bruised, and punctured. A clean cut wound running lengthwise with the muscle is the easiest to manage. First see how deep it is, make sure there is no foreign substance in it, and then stop the bleeding by applying hot or cold water. If a large artery has been cut, tie it. Put a teaspoonful of carbolic acid into a quart of water, and let a little run over the cut surface. If the wound is not deep the edges of it can be drawn together by silk thread steeped in the above solution. If the wound is across the muscle or an inch or more in depth, do not put in stitches, because the cut ends will move below them.

Torn cuts should have the bleeding stopped as described, and then be cleansed by letting water run over them. Do not try to sew them up. If the wound assumes an unhealthy appearance, use acetate of lead, ½-ounce; sulphate of zinc, ½-ounce; carbolic acid, 1-drachm; and water, 1-quart. Clean the wound with water, and apply this lotion twice a day.

Punctured wounds are the worst of all, because they are liable to have foreign substances such as hair and pieces of wood within, causing inflammation and sometimes mortification and death. To treat these probe the part to find the depth and direction of the wound, see if there is any foreign substance in it, and remove it. Clean it as well as possible, then dip a piece of soft muslin in a solution of carbolic acid, 3-drachms to 4-ounces of water, and press this to the bottom of the wound. Let it remain a few hours, and then draw it out, and put in a fresh one. Do this three times a day. When the wound begins to produce matter the danger is passed. Clean it out twice a day, and inject a little of the carbolic lotion used for cut wounds.

Bruised wounds if bathed with acetate of lead, $\frac{1}{2}$-oz. to 1-quart water, several times a day will not become inflamed. Sometimes matter will collect, and the parts will swell up and become soft and puffy. In such a case open it and inject a little of the following twice a day:—Zinc chloride, 2-drachms, water 1-quart. If it leaves a thickening, rub with the following ointment every second week. Biniodide of mercury, 2-drachms; lard, 3-ounces.

Cod Liver Oil is a nutrient for cattle that have done badly or suffer from debility due to obscure causes, but there are decided objections against using it continually for rearing purposes. Being a fish oil, it is constantly apt to nauseate the young animal much more than any vegetable cream substitute. It is well known that the oil offered so cheaply for calf-rearing purposes is not cod liver oil at all, but is made from the bodies of the fish. This common article, to our knowledge, is very dangerous as a food for young animals, as it frequently causes inflammation of the stomach and bowels, and sometimes ptomaine poisoning. We therefore regard it as altogether unsuitable for calf-rearing, and some recent trials in America have proved it most unsatisfactory for the purpose also.

Unsuitable for Calf Rearing.

Our opinion is amply confirmed by the report just published of experiments in calf-rearing made this season by the Agricultural Department, Armstrong College, Newcastle-on-Tyne, which reads as follows:

"Cod liver oil is liable to be adulterated with fish oil, or to be so badly refined as to be full of dregs. The eight calves referred to above as having died were lost in two groups of four each, nearly two years apart, and with similar symptoms, all pointing to ptomaine poisoning from putrifying matter in the oil."

For cases of debility, use only the guaranteed genuine oil, and begin with a tablespoonful, and gradually increase the dose to 2-oz. or 3-oz. twice a day, until the condition of the animal enables it to dispense with it. If, after a course of this treatment, there is no improvement, a veterinary surgeon's opinion should be obtained, as the animal may possibly be suffering with tuberculosis, or be what is generally known as a waster. If this is the case, any further time and money spent on the animal is generally useless, and the first loss will be the least.

Some Useful Stable Remedies.

Nearly every farm requires the services of at least one horse. An experienced man could often save considerable expense by keeping a small collection of various medicines for use as remedies for the more commonly occurring diseases and disorders among horses. Supplies of the following should always be kept available for use in cases of emergency, namely:

Linseed Oil and Aloes to use as purgatives.

Sulphate of Iron to use as a tonic, or as a remedy for worms.

Carbolic Ointment, Lysol, or other disinfectant, to use as an antiseptic.

Hartshorn, Turpentine, and Laudanum, to use as embrocations.

Red Iodide of Mercury, to use as a blister.

Subacetate of Lead, to use as a lotion.

The following may be recommended as prescriptions which any farmer can prepare for himself, provided he has the necessary materials by him:—

DRESSING FOR CUTS AND WOUNDS.—One part of pure carbolic acid to thirty parts of olive oil. A slightly weaker mixture makes an excellent lubricant and anticeptic for use in all cases of assisted or difficult parturition.

DRESSING FOR SORE SHOULDERS.—A good dressing for sore shoulders and backs, greasy heels, bruises when the skin is unbroken, and for uses in cases of sprain, is:—Sulphate of zinc, ½-oz.; sugar of lead, ½-oz.; water, 1-quart. Another lotion, excellent for hardening shoulders and backs, is:—Powered alum, 1-oz.; sulphuric acid, 1-drachm; water, 1-quart.

TONIC.—Sulphate of Iron, 1½-drachm; Sulphate of Quinine, 20-grs.; dilute Sulphuric Acid, 2-drs.; Water, 10-oz. To be given twice daily.

CONDITION POWDER.—Fenugreek, 2-parts; Carbonate of Iron, 1-part; Nitre, 2-parts; Gentian Powder, 1-part; Sulphur, 2-parts. Give 1-oz. daily in food.

EMBROCATION.—Hartshorn, 1-oz.; Turpentine, 2-oz.; Spirit of Camphor, 2-oz.; Laudanum, ½-oz.; Olive Oil, 6-oz.

BLISTER.—Powdered cantharides, 2-drachms; camphor, 5-grains; oil of lavender, 10-drops; lard, 1-oz. For splints, spavins, ringbones, and solid enlargements generally, whose absorbtion is desired, a preferable mixture is one part of biniodide of mercury to seven parts of lard. In using the blister, the part should be first clipped closely and the ointment vigorously rubbed in with the palm of the hand against the direction of the hair for four or five minutes. The head must be tied short, a cradle put on, or other precautions taken to prevent the gnawing or rubbing the blistered surface until the irritation has passed off. In twenty-four hours the skin should be thickly smeared with clarified lard, and the dressing repeated from time to time until desquamation is complete.

LOTION.—Subacetate of Lead Solution, 1-part; Tincture of Arnica, 3-parts; Water, 8-parts.

GRIPE DRINK.—A most useful drench is: Oil of turpentine, 3-oz.; tincture of opium, 1½-oz.; linseed oil, 1-pint. Give this as it is, followed by a little gruel, walk the horse about to prevent rolling, rub the belly and legs with a wisp, and, if necessary, repeat the medicine in two hours. Not more than two doses should be given; indeed, if the pain persists without relief for so long as this it is high time a veterinary surgeon was sent for. It is a cheap, easily procurable remedy; remains good for an indefinite period if kept well corked and sealed, and is quite the best thing we know of to keep on hand for use in emergencies.

To our Customers only.

If you have any other difficulty with your calves, and will write us full particulars of same, we will give you by return of post the benefit of our practical experience, coupled with the best advice.

Our Last Word.

Finally, we trust that the information we have endeavoured to convey, will prove of service to all agriculturists, and stimulate their interest in calf rearing, as a profitable and necessary branch of their business.

We cannot help thinking that the position of the British Farmer becomes more hopeful every year, as there is every sign that his skill and industry will be more justly remunerated in the future. The gigantic growth of the world's population is raising the prices of wheat, meat, fats and wool universally, and it is most improbable that they will ever descend again to the old ruinous levels of past years. Then, as we have shown, the British Farmer has a practical monopoly in three of the most important branches of his business, viz., the raising of young stock, the production of milk, and the making of young beef, and to these a fourth may be quite properly added, viz., the breeding of British pedigree stock for export; while on the other hand he can draw without restriction on the world for his feeding stuffs, machinery and general needs, and thus buy nearly everything considerably cheaper than any other agriculturist on the face of the earth.

He can also avail himself of the vastly improved methods of breeding and rearing poultry, by which undoubtedly money can be made easily and surely.

We therefore sincerely hope that the sun of prosperity will shine on all engaged in our great national industry, and thus conduce to the welfare and happiness of the whole countryside.

Press Notices on the last Edition of "Successful Calf Rearing."

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It is brimful of useful information, given concisely, and ought to be in the hands of every farmer.—*Irish Farming World.*

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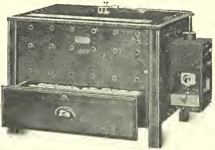

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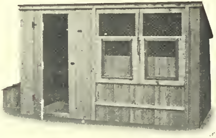

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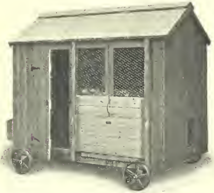

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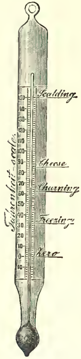

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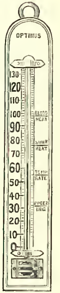

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